Fortress

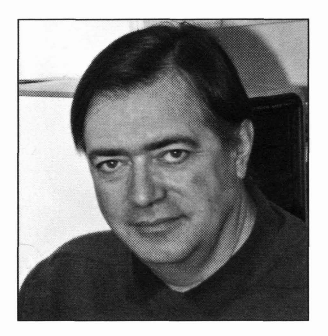


The Fortifications of Gibraltar 1068–1945

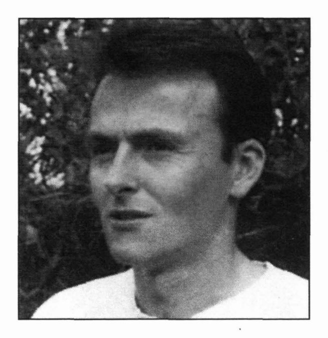
Darren Fa & Clive Finlayson • Illustrated by Adam Hook



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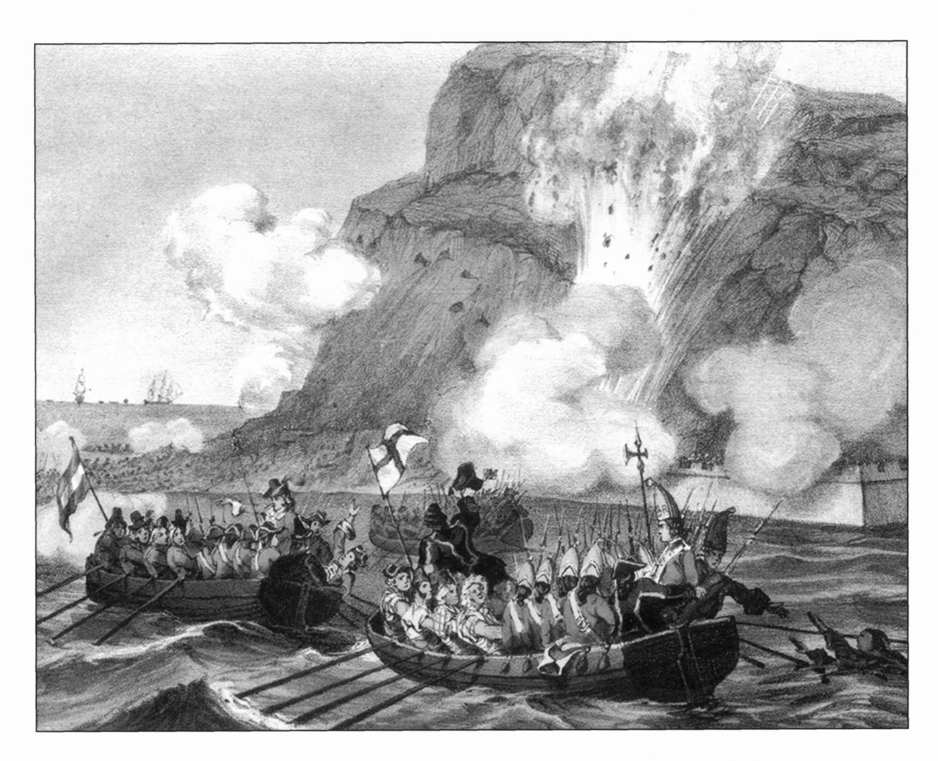
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The Fortifications of Gibraltar 1068–1945



Darren Fa & Clive Finlayson • Illustrated by Adam Hook

Series editors Marcus Cowper and Nikolai Bogdanovic

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In addition to Collections Online, you can visit the Visitor Rooms where you can explore over 8 million photographs, thousands of hours of moving images, the largest sound archive of its kind in the world, thousands of diaries and letters written by people in wartime, and a huge reference library. To make an appointment, call (020) 7416 5320, or e-mail mail@iwm.org.uk

Dedication

This book is dedicated to the people of Gibraltar whose personal sacrifice to the fortress and the defence of freedom has been immense.

Acknowledgements

We are grateful to a number of people for their contribution to the study of the fortress of Gibraltar. Thanks to our editor, Nikolai Bogdanovic at Ilios Publishing, for his patience and support throughout. Others have assisted in specific aspects of this book including the production of drawings and photographs. They are specifically acknowledged in the book. Among all these we would like to highlight Col. Arthur Ferrary, José Aguilera, Julio Aguilera, Michael Sanchez, Flavio Madeira, Terrance McGovern, Manuel Jaen, Maria Farrugia, John Bugeja, Pete Jackson, Philip Smith, Lionel Culatto, Francisco Giles Pacheco, Fran Giles Guzman, Kimberly Brown, Stewart Finlayson, Dennis Beiso, Marie Mosquera, Aaron O'Sullivan, Carl Viagas, Claire Valarino, Simon Evans, Mark Ainsworth, Richard Durrell and Jean Paul Latin. We are especially grateful to our wives Robyne and Geraldine for their support and encouragement.

Linear measurements

Dimensions of materials and construction are mostly given in inches and feet rather than metric. To covert these figures to metric the following conversion formulas are provided:

inches to centimetres	multiply inches by 2.540
feet to metres	multiply feet by 0.3058

The Fortress Study Group (FSG)

The object of the FSG is to advance the education of the public in the study of all aspects of fortifications and their armaments, especially works constructed to mount or resist artillery. The FSG holds an annual conference in September over a long weekend with visits and evening lectures, an annual tour abroad lasting about eight days, and an annual Members' Day.
The FSG journal *FORT* is published annually, and its newsletter *Casemate* is published three times a year. Membership is international. For further details, please contact:

The Secretary, c/o 6 Lanark Place, London W9 1BS, UK

The Coast Defense Study Group (CDSG)

The Coast Defense Study Group (CDSG) is a non-profit corporation formed to promote the study of coast defenses and fortifications, primarily but not exclusively those of the United States of America; their history, architecture, technology, and strategic and tactical employment. Membership in the CDSG includes four issues of the organization's two quarterly publications the Coast Defense Journal and the CDSG Newsletter. For more information about the CDSG please visit www.cdsg.org or to join the CDSG write to:

[Attn: Glen Williford] Coast Defense Study Group, Inc., 634 Silver Dawn Court, Zionsville, IN 46077-9088, USA

Contents

Introduction

Uproot the mountains of the world
Save this. This one retain,
But free from fear and misery;
Here let peace reign.
Abu Abd'al-Ath Muhammad Ibn Galib, 13th-century Islamic chronicler

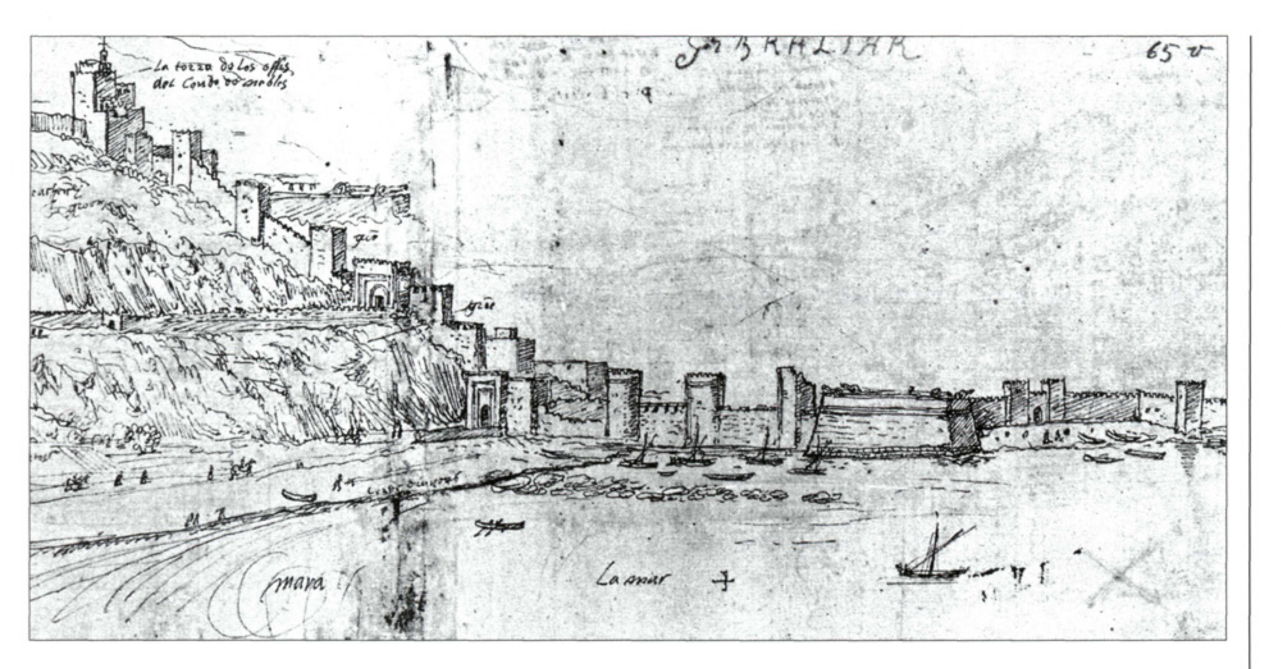
The Rock of Gibraltar has commanded a strategic vantage point at the meeting place of the Atlantic Ocean and Mediterranean Sea and at the bridgehead between the continents of Europe and Africa since the earliest times. Over the years, this accident of geography has led to this small rocky promontory assuming an importance in world history that is totally disproportionate to its size.

The unique combination of strategic geographical position and dominating topography has attracted people to this site for millennia, from Neanderthals through Phoenician sailors to the British in the 18th century. Formed from a microplate of Jurassic Limestone, the Calpe of the ancients was the northern Pillar of Hercules and had a symbolic significance that has persisted until today. The history of Gibraltar has, since then, involved a close relationship between the human inhabitants and the physical characteristics of the Rock.

Moreover, in defensive terms Gibraltar seemed designed for the purpose of being a fortress. The Gibraltar peninsula (36° 07′ N 5° 21′ W) is 6km long by 1km wide and rises abruptly to a height of 426m above sea level. The flat sandy isthmus linking it to the mainland of Spain did not allow an enemy to approach under cover. A swampy area in front of the northern approaches to



An aerial photograph of Gibraltar from the south. Note how the town is nestled on the gentler western slopes whereas the steep east side is virtually unscalable. In the foreground are Europa and Windmill Hill Flats. The dockyard moles are clearly visible to the left of the picture and the isthmus to the Spanish mainland can just be made out behind the mass of the Rock. (Courtesy of the Gibraltar Museum)



This sketch of the Landport by Anton van den Wyngaerde dated 1567 captures the beginning of the end for the pre-gunpowder defences. Note how the round towers are being demolished and bastions with mounted guns constructed in their place. (Courtesy of the Austrian National Library, Vienna)

the town (later dug out and flooded as an inundation) further complicated access. The Rock itself rose sharply, providing an imposing barrier to troops along its northern and eastern sides. The town nestled in its shallower western slopes whilst to the south there were sea cliffs and beaches, all defendable against seaborne attack. It is therefore no surprise that this promontory has been fought over throughout recorded history, its natural features becoming steadily incorporated into an increasingly complex series of fortifications.

By the start of the 8th century AD, the armies of Islam had reached the southern end of the Strait of Gibraltar – a point from which the Islamic invasion of the Iberian Peninsula was launched in 711. Landing at Gibraltar, the leader of the attacking forces, a Berber named Tarik b. Ziyad, used it as the bridgehead for the conquest. It was from its original title, Jebel Tarik (Tarik's Mountain), that we get the name for Gibraltar.

However, it was not until 1068 that the ruling Spanish Muslims built a large fort, initially to protect themselves from an attack across the Strait by expanding Berber tribes. The Almohad Emir of Morocco, Abd al-Mumin, ordered a city to be built in 1160 with all the necessary fortifications. This small walled citadel laid the foundations for the future City of Gibraltar. The clashes between succeeding rivals led to further improvement of the fortifications. A good number of these elements now form part of fortifications that have evolved over time to incorporate the succeeding developments of both Spanish and British engineers.

After the Spanish capture of Gibraltar in 1462 on the feast day of St Bernard, now Gibraltar's patron saint, the inhabitants carried out further works. Luis Bravo de Acuña, an engineer concerned with the repair and strengthening of the fortifications of Gibraltar, produced some excellent plans in 1627 that illustrate the layout and the evolution of the city. Again, many of the early Spanish works were subsumed within later British fortifications, but some important vestiges remain, in particular Charles V Wall, built to protect the southern approaches to the town. Subsequent additions helped form the early bastion trace of the city as gunpowder eclipsed earlier weapons.

Gibraltar remained a Spanish possession until the early 18th century. At this time, the War of the Spanish Succession had pitted two rival claimants to the throne: the French Philip of Anjou (Philip V) and the Austrian Archduke Charles III. It was then, in 1704, that a combined Anglo-Dutch force led by

A photograph of the Upper Union Gallery showing embrasures for guns enfilading the northern approach to the Rock. (Authors' photograph)



Adm Sir George Rooke in support of Charles III, took Gibraltar to begin the latest, uninterrupted, period of British rule.

The 18th century saw three sieges including the most severe, known as the Great Siege, which lasted from 1779 to 1783. This early British period also saw great changes to the defences of Gibraltar and many salient examples still survive. Notable among these are the King's Bastion, at the time an innovatively designed fortification which was instrumental in the defence of the Rock, and the northern defences, a system of tiered batteries and tunnelled galleries which took advantage of the Rock's height to protect its land front.

Strengthening of the fortress continued in the 19th century, when it developed into the ultimate gunner's station, a fortress of such impregnability that it coined the phrase 'as strong as the Rock of Gibraltar', a term now applied to anything considered impregnable. Many fortifications and armaments remain dating to this time, including retired batteries along the west face of the Rock, as well as the zenith of rifled muzzle-loading artillery, the 100-ton gun.

The late 19th and early 20th centuries saw the arrival of the 9.2in. coastal defence guns, which eventually closed the Strait. Increasing German naval power prompted the British high command to commission a new dockyard for Gibraltar, which not only changed the face of the Rock but also strengthened Gibraltar's role as an important naval base.

During World War II it was the naval base for the Mediterranean Task Force 'H', as well as a vital stop for supply convoys. A new airfield, considered instrumental in the North African offensive, was built and an unprecedented amount of tunnelling took place on the Rock. Gibraltar became a veritable warren of tunnels that housed guns, hangars, ammunition stores, barracks and hospitals.

Gibraltar thus not only preserves in its defences a rich testament to extended periods of human conflict, but also contains a unique record of the evolution of fortifications spanning the better part of a millennium.

This protracted period of fortification and evolution of a city within the fortress walls, incorporating both natural and man-made features and including



The Landport defences showed continuous development as successive engineers worked to protect Gibraltar's vulnerable land front. This is the 1865 Rock Model, based on surveys by Lt. Charles Warren, RE. (Courtesy of the Gibraltar Museum)

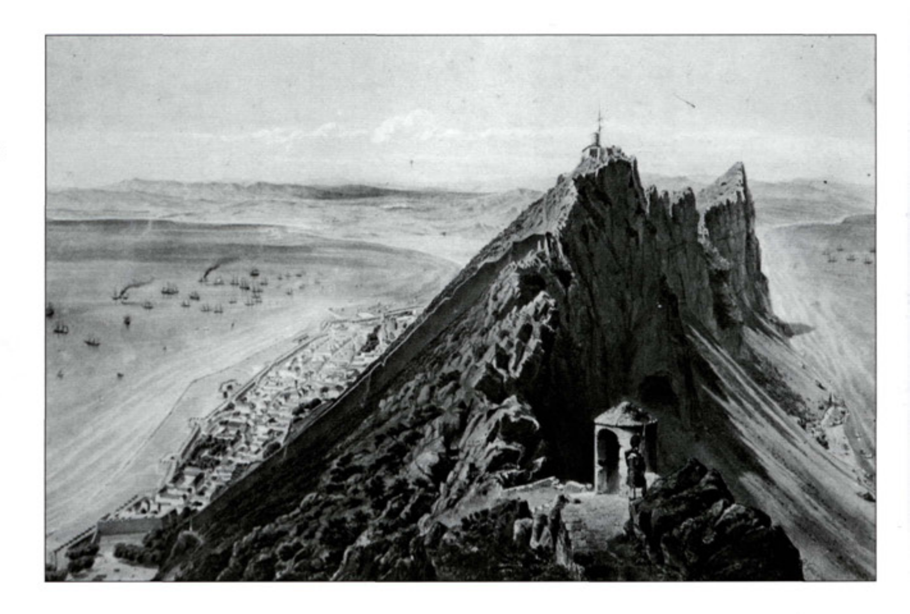
elements of Islamic, Spanish and British military structures, is what makes the fortress of Gibraltar unique in the world, and perhaps even more so its symbolic perception.

Gibraltar's defences

The defences of Gibraltar developed over the centuries into a complex system of fortifications. To allow the reader to navigate through a potential maze of descriptions, we have divided the defences into a number of general areas:

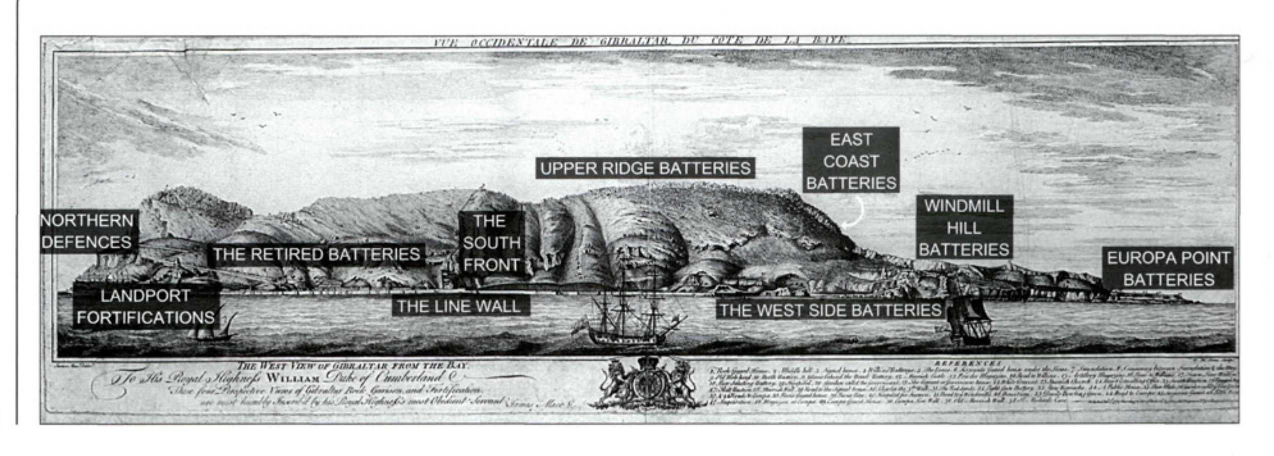
1. The Northern Defences, developed to fire out over the isthmus and flank the Landport Fortifications (including defences along the north face of the Rock).
2. Landport Fortifications, protecting what was potentially a weak point of entry to Gibraltar across the isthmus, including the Inundation, Landport front and Devil's Tongue Battery (Old Mole).
3. The Retired Batteries. As a result of a report made by Sir John Jones in 1841, many of the coast defence guns, were pulled back up the hill away from the water's edge. This both increased their range and made them difficult for an enemy to spot.

A late 19th-century painting showing the Line Wall and part of the South Front (upper Charles V Wall). From top to bottom the following are clearly visible: Montagu Bastion, Orange Bastion (both with counterguards), Zoca Flank, King's Bastion, Wellington Front and South Bastion. (Courtesy of the Gibraltar Museum)



4. The Line Wall is the main sea wall of Gibraltar running from Landport to the foot of the South Mole, covering the coastal defences that protected the town's western coastline from bombardment and amphibious landings. It began at North Bastion (which is the pivot with the Landport defences), and continues through to Engineer Battery just south of the New Mole).
5. The South Front (the line of defences stretching between South Bastion and the top of the Rock).
6. The Upper Ridge Batteries. First mounted in the late 19th century, these were heavy (mainly 9.2in. breech-loading) gun batteries for coastal defence sited at the extreme top of the Rock.
7. The West Side Batteries (batteries from Napier of Magdala through Rosia to Camp Bay).
8. East Coast Batteries, whose role was to protect the Mediterranean coast against an enemy landing.
9. Windmill Hill Batteries, stretched along the periphery of Windmill Hill Flats, and ascending the Rock behind, were designed to support the Europa defences and provide another obstacle to an attacking amphibious force.
10. Europa Point Batteries, stretching from Camp Bay on the west side of the Rock to the 3rd Europa Advance Battery on the East side. In most cases these are an extension of the natural cliff line and are the southernmost of the defences of Gibraltar.

The main zones of Gibraltar's defences are shown on this view of the western face of the Rock dated 1772. (Courtesy of the Gibraltar Museum)



Chronology

711 Tarik b. Ziyad crosses the Strait and initiates the Muslim conquest of Al-Andalus.

1068 The Arab governor of Gibraltar ordered to 'build a fort on Jebel Tarik and to be on guard and watch events on the other side of the Straits', in anticipation of an attack from the revolutionary Almoravid sect.

1146 Gibraltar falls to the Almohades. Gibraltar refortified to protect Algeciras from Christian attacks from the east, and is renamed Medinat-al-Fath (City of Victory or of the Entrance) in 1160.

1309 Gibraltar's first siege, by Ferdinand IV of Castille, is successful and Gibraltar falls into Castillian hands for the first time.

1309–12 Further fortification works carried out including the construction of a galley house or Atarazana, in the old port.

1315 Gibraltar's second siege, which is abandoned by the Merinids on seeing the approach of a Castillian naval force and relieving army.

1333 Gibraltar's third and fourth sieges. The fortress falls after a four-month siege to a combined Islamic force under Abu al-Hasan of Fez and Mohammed IV of Granada. King Alfonso XI of Castille's immediate attempt to retake the Rock is unsuccessful.

1333–38 Abu al-Hasan refortifies Gibraltar, 'with strong walls as a halo surrounds the crescent moon.'

1349–50 Fifth siege of Gibraltar, led by Alfonso XI. Cannon used for the first time against the fortress. The siege is lifted following Alfonso's death from bubonic plague whilst in the siege camp.

1374 Control of Gibraltar passes from Fez to Granada in return for military support.

1411 Sixth siege of Gibraltar. This pits Muslim against Muslim and results in Granada retaking control of the Rock from Fez.

1436 The seventh siege of Gibraltar ends with the drowning of the Christians' leader, Enrique de Guzman, Second Count of Niebla, together with 40 of his knights and men-at-arms, just off the Red Sands on the western side of the Rock.

1462 Eighth siege of Gibraltar, when the fortress capitulates to Christian forces on 20 August, St. Bernard's day. Notable for the dynastic wrangles by Spanish noblemen over the legitimate claim to its capture. Control of Gibraltar passes to Juan Alonso de Guzman, first duke of Medina Sidonia, but later in the year Henry IV of Castille annexes the Rock and orders Medina Sidonia out of Gibraltar.

1466–67 A civil war between Henry IV and his half-brother, the pretender Prince Alfonso, leads to the 15-month-long ninth siege of Gibraltar, where the house of de Guzman is re-established.

1501 Gibraltar returns to the Crown by royal decree.

1502 Grant of Royal Arms of the 'Castle and Key' made to the City of Gibraltar.

1506 The tenth siege of Gibraltar, a failed attempt by the third duke of Medina Sidonia to retake it.

1552 Charles V, King of Spain and Holy Roman Emperor, sends the Italian engineer Giovanni Battista Calvi to fortify the southern approaches. This results in the construction of Charles V Wall.

1560s Improvement of the defences by the Italian engineer Giacomo Fratino.

1567 Anton Van Den Wyngaerde visits Gibraltar and makes several accurate drawings of the Rock and its fortifications.

1575 Construction of Philip II Wall started.

1589 The fortifications are extended and improved based on designs by Daniel Specklin (Speckle), the imperial engineer.

1607 May 5, Battle of Gibraltar. Dutch admiral van Heemskerk sails into the Bay with 26 small sailing ships and defeats a fleet of larger Spanish ships and galleys at anchor.

1624–27 Defences improved under the reign of Philip IV. Gun platforms added to the Line Wall.

1627 Don Luis Bravo de Acuña writes a report for Philip IV on Gibraltar's defences. In this he provides a number of detailed maps and recommendations.

1704 The eleventh siege of Gibraltar, during the War of the Spanish Succession. The Rock is captured on behalf of the Hapsburg pretender, Charles II, by a combined Anglo-Dutch fleet under the overall command of Adm Sir George Rooke on August 4 (NS – July 24 OS).[1]

1704–05 Twelfth siege of Gibraltar by forces under King Philip V of Spain. Running from October 1704 to April 1705, it is unsuccessful in its aim of restoring the Rock to the Spanish crown.

1713 Spain cedes Gibraltar to Britain 'in perpetuity' in Article X of the Treaty of Utrecht.

[1] At the time of the capture of Gibraltar, Spain was now using the corrected Gregorian calendar, termed 'New Style' (NS) but the English still hung on to the earlier Julian calendar, termed 'Old Style' (OS). By 1704 this had led to a difference of 11 days between the calendars so the date of the capture differs according to the nationality of its source. Britain and her colonies did not adopt the Gregorian calendar until the middle of the 18th century.

1727 A combined Spanish–French force attempts unsuccessfully to capture Gibraltar. The resultant thirteenth siege lasts four months.

1779 September 12: Mrs Skinner fires the first shot of the Great Siege of Gibraltar.

1780 January 21: first relief of Gibraltar by Adm Rodney.

1781 April 12: second relief by Darby. November 27; Great Sortie commanded by the governor, Gen Augustus Eliott, destroys the enemy advanced positions on the isthmus.

1782 Lt George Koehler RA develops the depression carriage. First tunnels commenced under the supervision of Sgt Maj Ince. September 13: attack by and destruction of the floating batteries. October 13; third relief by Adm Lord Howe.

1783 February 2: end of the Great Siege.

1805 Battle of Trafalgar takes place near the Rock. Nelson's body arrives at Gibraltar on October 28 aboard HMS *Victory* preserved in a barrel of brandy.

1830 Gibraltar becomes a Crown Colony.

1841 Gen John Jones visits the Rock and makes proposals for the improvement of the defences, including retired batteries.

1888 Generals Nicholson and Goodenough recommend the use of 6in. QF (quick firing) guns for close defence and 9.2in. heavy guns along the ridge of the Rock.

1892 Two 100-ton RML (rifled muzzle-loader) guns arrive at Gibraltar to be sited at Victoria and Napier of Magdala Batteries.

1894 Work begins on the construction of a new 'torpedo-proof' harbour for Gibraltar.

1914–18 The Great War. Gibraltar used mainly as a convoy bunkering port and for anti-submarine operations. In August 1917 the 6in. guns of Devil's Gap Battery engage and sink a U-Boat.

1939 Great Britain declares war on Germany. Gibraltar again mainly used for convoy collection and as the base for anti-submarine operations.

1940 Non-essential Gibraltarians are evacuated to England, Madeira, Northern Ireland and Jamaica.

1940 Force H, consisting of a battlecruiser, two battleships and an aircraft carrier (*Ark Royal*), is assembled and starts to operate from Gibraltar.

1940 Hitler conceives Operation *Felix*, the plan to capture Gibraltar.

1941–42 Attacks by Italian 'charioteers' on shipping in the Bay. Lt Cmdr 'Buster' Crabb charged with harbour defence.

1941–44 Runway built at North Front using rock excavated from tunnelling. This becomes a vital springboard for Operation *Torch* (the Allied invasion of North Africa).

1942 Gen Dwight D. Eisenhower directs Operation *Torch* from tunnels within the Rock.

1943 Polish Gen Wladyslaw Sikorski and his entourage die in an aircrash during take-off from Gibraltar.



The 100-ton gun and its traversing carriage today, repainted and with safety barriers added. (Courtesy of Stewart Finlayson).

Islamic Gibraltar

If someone wishes to visit al-Andalus, this is its door.
Lisan al-Din Ibn Jatib (1313–74)

There is no archaeological evidence of the first episodes of Islamic control and domination of the Rock of Gibraltar, but its very name, Jebel Tarik, indicates its strategic importance as bridgehead in the conquest of al-Andalus. It is here that the landing point of the Berber commander Tarik b. Ziyad is traditionally placed in April AD 711. Possibly in the early days Gibraltar was no more than a fortified base with watering facilities for ships.

The first evidence of a fortified city comes from the foundation of the Madinat al-Fath (the City of Victory) by the Almohad caliph Abd al-Mumin in 1160–61. An order to the Almohads of Granada and Seville was given on March 19, 1160, and two of the most important architects of al-Andalus, al-Hayy Ya'is and Ahmad ibn Baso, were charged with the works. Islamic sources of the day indicate that the construction included a main mosque, a palace for the sovereign (possibly the site of the present-day baths), defensive walls with a single access to the continent (Bab al-Futuh, the Gate of Conquest), a windmill on the top of the Rock, a water channelling system, cisterns, a large water tank and a harbour.

Towards the second half of the 13th century the Castillian monarchs advanced south with the aim of controlling the Strait of Gibraltar and removing the threat of new invasions from North Africa. The protracted process has been described as the 'Battle of the Strait'. As part of the process, and while maintaining a siege of Algeciras, Gibraltar was captured by the Castillians in 1309.

> *With uplifted hands he [Ferdinand IV] gave thanks to Providence for the reduction of his dominion of a Rock and Castle, so important and almost impregnable.* (Ayala, p.55)

It would remain in their hands for only 33 years. During this short occupation by the Castillians an Atarazana, or Galley House, was constructed within the tidal area at the foot of the citadel, accessible through the Water Gate.

The north African Berber tribes known as Banu Marin – the Merinids – renewed the tradition of the *jihad* against territories in the Iberian peninsula. A consequence of this process was the siege of Gibraltar by Abd al-Malik in 1332. After two consecutive sieges in 1333, Gibraltar fell to the Merinids. The work known as the *Musnad*, written around 1370–71 by Ibn Marzuq, describes the life of the Merinid emir Abu al-Hasan and devotes special attention to Gibraltar, describing the reconstruction that took place. The fortifications were strengthened and repaired and points of weakness improved. A wall was constructed to protect the entire western and southern flanks and these were strengthened with towers and connecting passages. The city was expanded as part of the process.

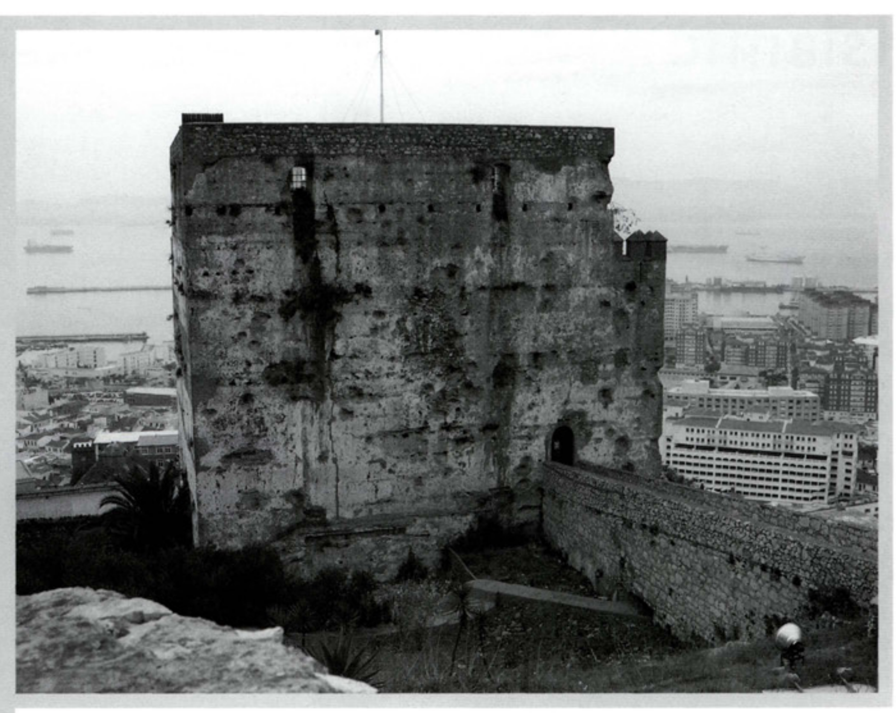
The Merinids kept garrisons on the northern shore of the Strait until 1358, and Abu al-Hasan's successor, Abu Inan, constructed a wall that reached the southernmost part of the peninsula in 1350. The Merinids gradually lost influence over Gibraltar to the Nasrids,

The excavation of the early medieval foundations of the present-day Cathedral of St Mary the Crowned. This was the site of the main mosque, which was subsequently converted to a Roman Catholic church by the Spanish. Damage caused during the Great Siege led to its new façade being constructed further back than was originally the case. The circular platforms that can be seen in front of the Cathedral are the supports for the pillars of the original entrance to the church. (Authors' photograph)



The Tower of Homage and Inner Keep

The Tower of Homage that still stands today appears to have been expanded by the Merinids over an earlier Almohad tower. Also known by a variety of other names such as the Calahorra, at 320m² it has the largest footprint area of any such tower in al-Andalus. It almost did not survive until the present, not because of an act of war but rather because it was felt that it gave the inhabitants a false sense of security and for this reason Luis Bravo de Acuña recommended its demolition in 1627. Current investigations led by the Gibraltar Museum have allowed a greater understanding of how it was constructed and added to over time. The white patches on the outside of the Tower are the remains of lime whitewash that date to Spanish times when the Tower was also known as the Torre Blanca (white tower). The crenellations are mostly modern reconstructions dating to the 1970s. Six embrasures for cannon still remain on the platform atop the tower, originally built to defend the approaches. The east face of the Tower shows evidence of impact craters. These probably date to the siege of 1333, when Alfonso XI of Castille established three siege machines above the castle, probably in the area of old Willis's Battery, and shot projectiles onto the castle. Note also the putlog holes along the upper section of the tower in the photo, to support a wooden hoarding.



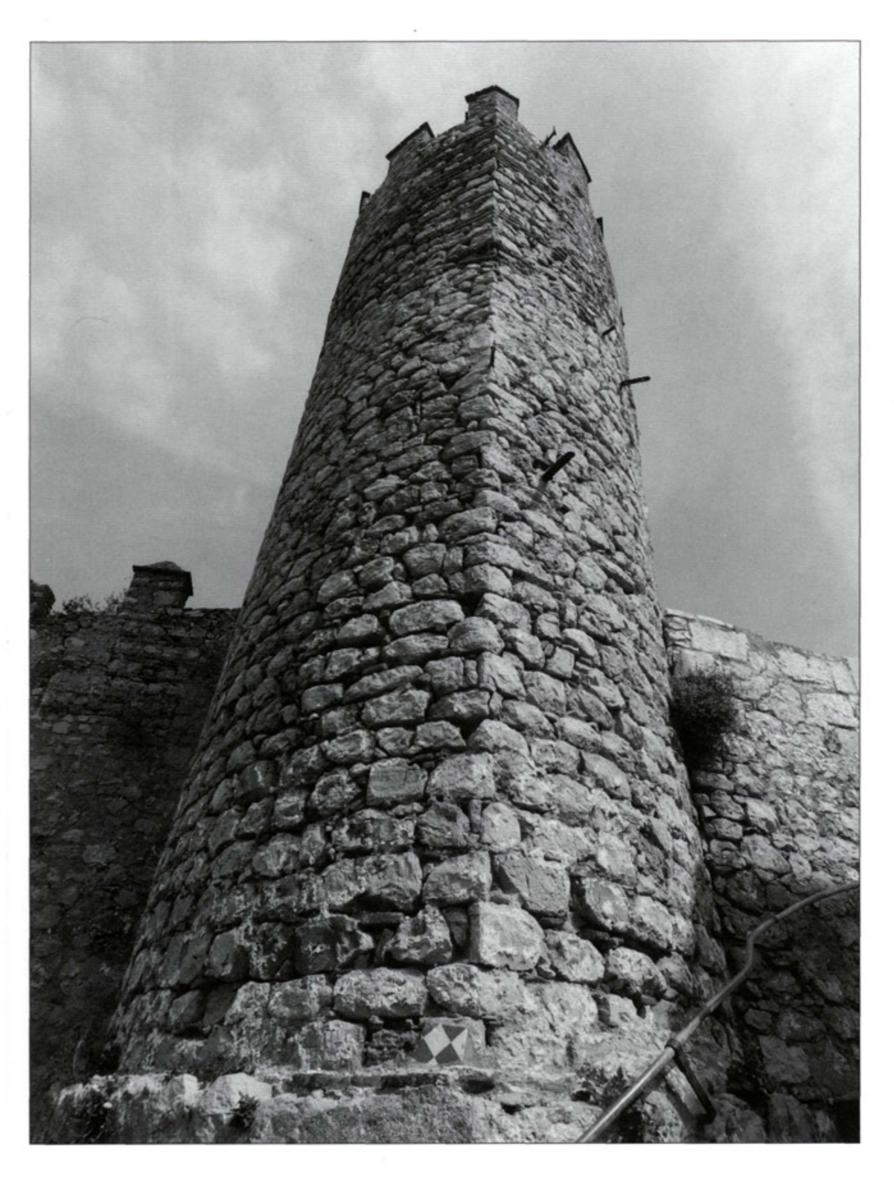
who ruled from Granada, and they eventually took control of the place in 1374. By 1379 Muhammad V of Granada, aware of the difficulty of defending Algeciras, razed it to the ground and made Gibraltar head of the territories of the northern shore of the Strait. After half a century of calm, Gibraltar finally fell to the Castillians in 1462.

Few cities illustrate the close relationship between political power and Islamic urban organization like Gibraltar does. Gibraltar formed the gateway of the Islamic conquest, and its denomination as 'City of Victory', chosen by al-Mumin, gave it a unique character. Further symbolic and strategic significance was attached subsequently by the Merinids.

In Merinid and Nasrid times the city occupied the northernmost part of the present-day city, from the base of the Rock to the seashore. The elevated part was occupied by the castle including its Qasbah. Its eastern flank, vulnerable to attack, had the Tower of Homage, the most powerful of all constructed in al-Andalus. To the north-west of the tower a flanking ziz-zag wall ran down towards the old town. At the base of this wall was the Gate of Granada, the main entry point by land to the old town. The city was divided into three main quarters: the old town just below the castle, known in later Spanish times as the Villa Vieja; the port area below that had walls, towers and three separate access gates (later called the Barcina by the Spanish); and a residential quarter to its south known as Turba al Hamra (literally 'red sands', on account of the nature of its soil). A large defensive tower stood at the north-west corner of the Barcina, presently the site of the North Bastion. The port area's three gates were the Land Gate (later known as Puerta de España, now the Landport), the Sea Gate (later Puerta de la Mar – modified in British times and now known as Casemates Gates) and the gate leading out into the Turba, later Puerta de la Barcina, henceforth referred to here as the Barcina Gate.[2]

Alonso Hernández Del Portillo, in the following passage from his *Historia de Gibraltar*, describes what remained of the Islamic Castle in his day.

2 Barcina was the Spanish name for the Islamic port area and its name may derive from Dar al Sinaha, an Islamic reference to the Galley House.

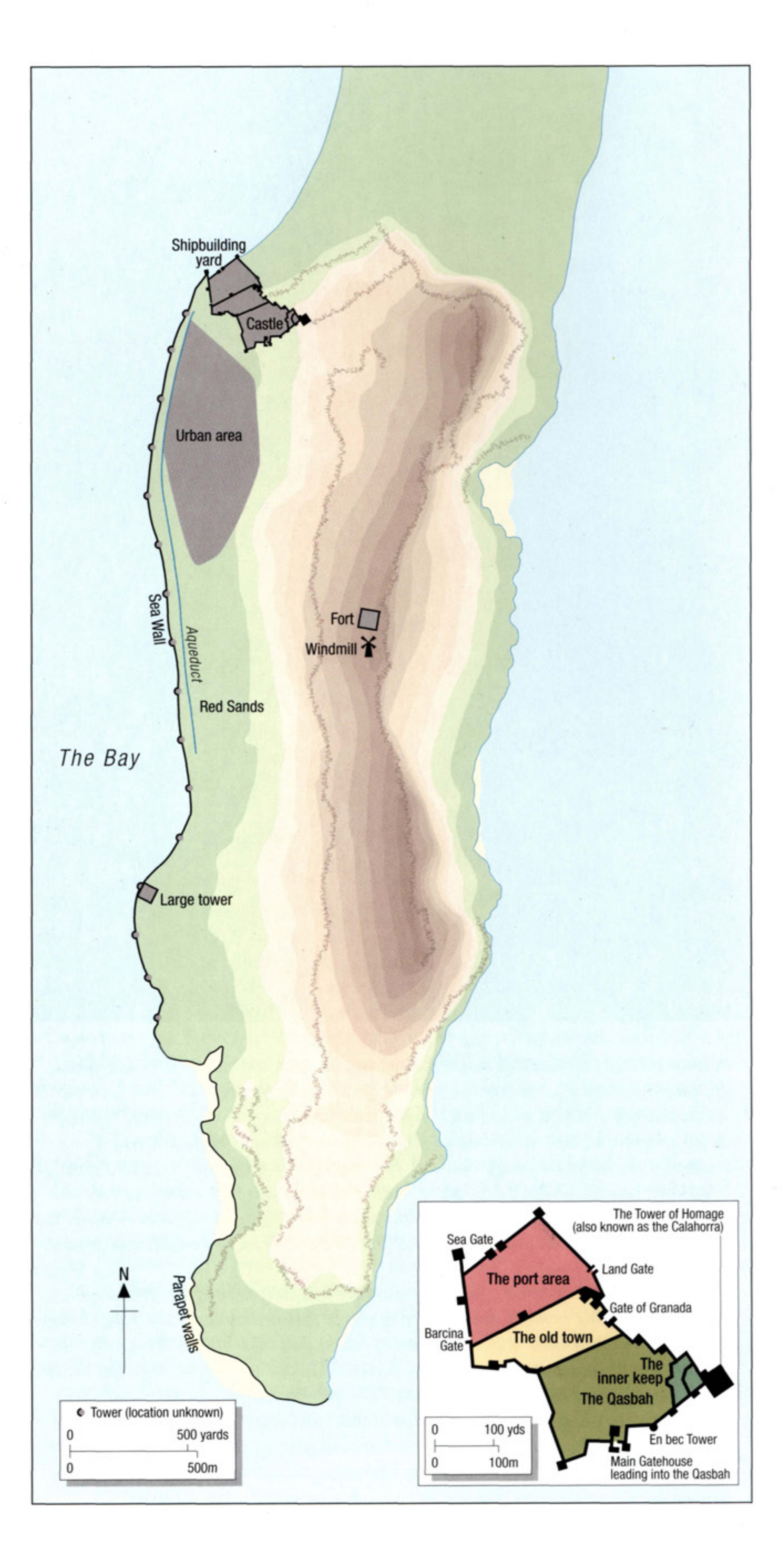


A flanking tower constructed to the east of the main gatehouse at the salient angle of two curtain walls. It is the only remaining *en bec* (beaked) tower, a way of strengthening its base, especially against mining. All the other remaining towers are square. Its stone construction with alternating layers of red brick suggests a later construction date. (Authors' photograph)

Within this castle, there is a tower they called 'La Calahorra', a name which appears to be Arab … along the front it has a redoubt they call the 'Giralda', surrounded by fortified walls, and which was capable of housing enough people to be able to defend it. Towards the interior of this Giralda, which to me resembles an Italian citadel, one can find the Tower they call 'La Calahorra'. Within this tower, one can find ovens, a cistern, and halls and armouries, as well as other dwellings. The structure and architecture of this tower is wonderful, and worthy to be dedicated to Hercules, and should be seen by any inquisitive visitor to this city.

On the top of this tower, there is a warning bell that is rung when the enemy is approaching, be it night or day. The moment this bell is rung, the people flee the city and make their way to the castle. As mentioned above, the castle has various dwellings, as well as a Royal Suite, to house its people, together with magnificent vaults of elaborate Moorish design. It also has various halls that have been renovated for Spanish use, by Alvaro de Bazan, to be used as a home for his wife and daughter. Extensive gardens can also be found, with all sorts of fruit-bearing trees as well as vineyards and other vegetables, together with some woodland, where you can find rabbits and deer amongst other animals.

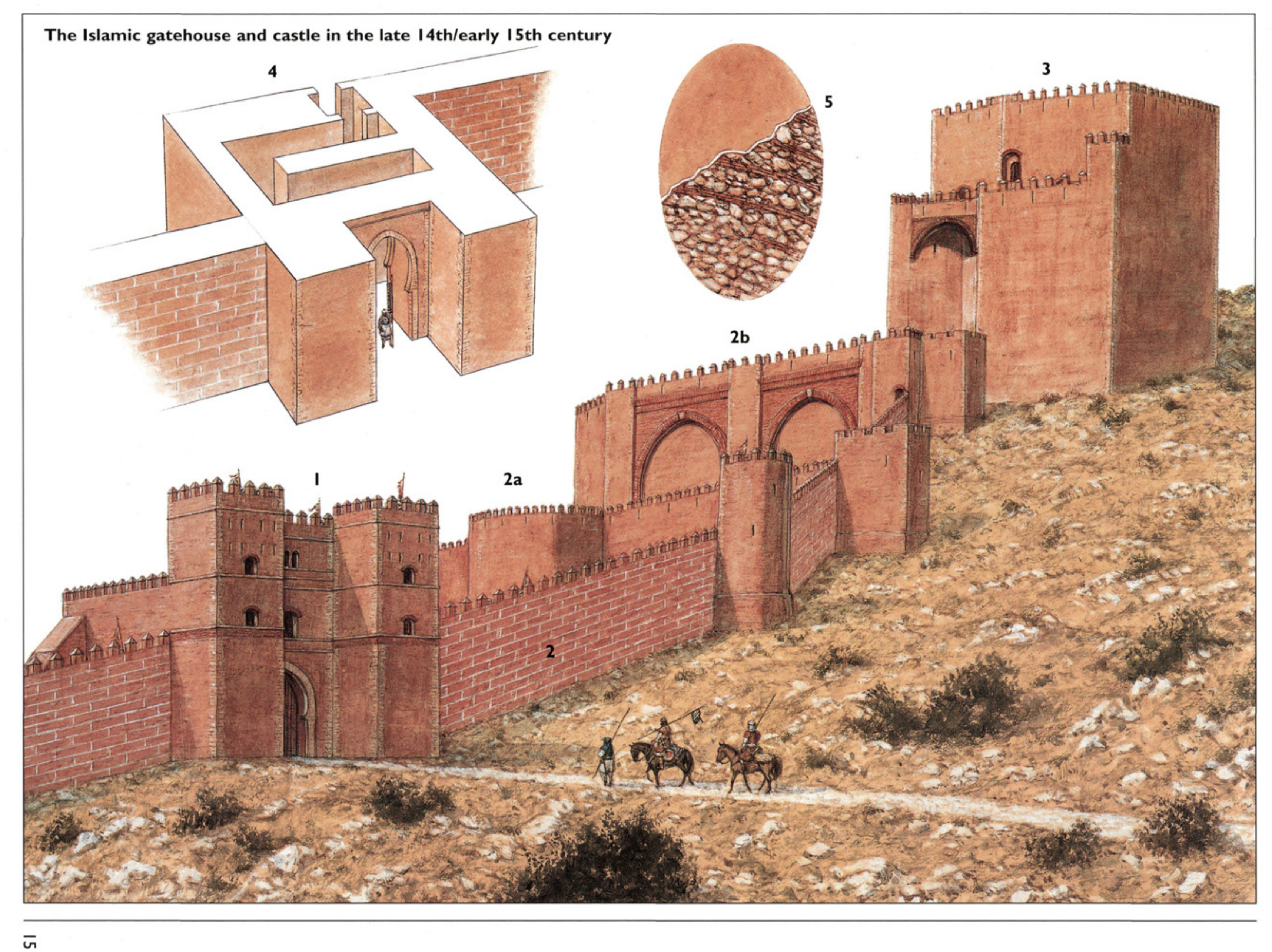
RIGHT A map of the defences of Islamic Gibraltar in the late-15th century. The inset at bottom right shows the area around the castle and its fortifications. At this time, the isthmus to the north comprised marshy ground, forming a natural defensive barrier.

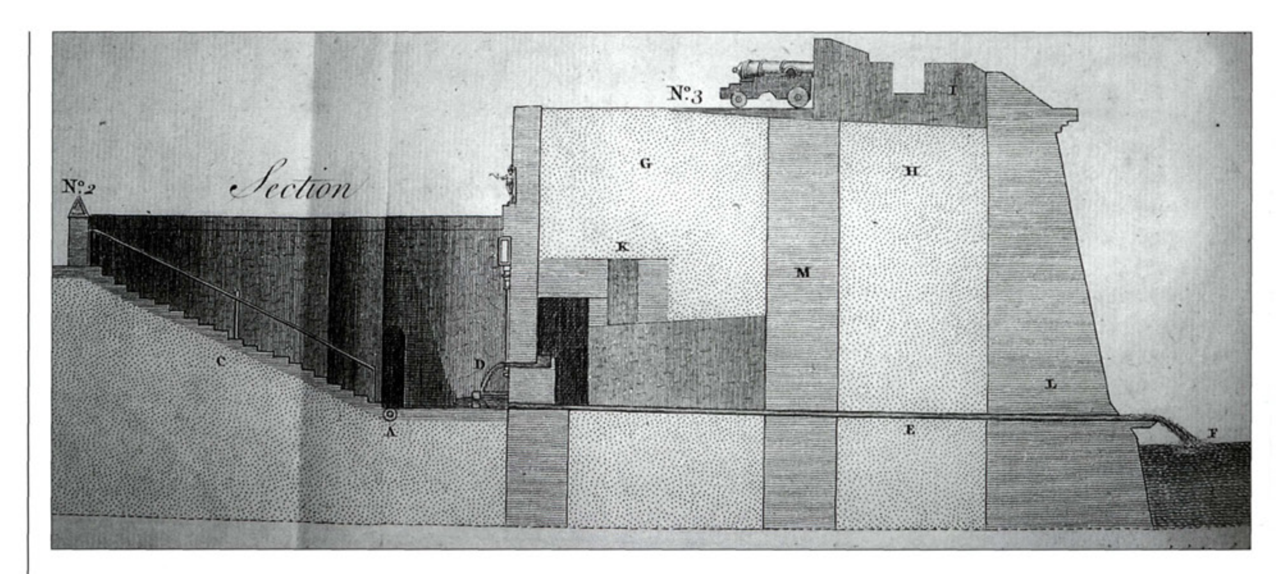


OPPOSITE PAGE

The Islamic gatehouse and castle in the late 14th/early 15th century

The main illustration shows the Islamic gatehouse (1) with the curtain wall (2) leading up to the outer keep (2a), the inner keep (2b), and the Tower of Homage (3), also known as the Calahorra. The defences are excellent examples of pre-gunpowder fortifications, with high walls, tall towers, and merlons atop both of these. A cutaway view of the ground floor of the gatehouse is also shown (4), with views of its internal details: the gatehouse still survives today, but has seen many changes. A further inset exposes the construction methods used for building the later walls (5): earlier walls (some sections of which remain) were made of tapia, a lime-based mortar, onto which a decorative brickwork pattern was added. In later walls the tapia was used as a render.


The Islamic gatehouse and castle in the late 14th/early 15th century
4
5
3
2b
1
2a
2



TOP Section of the Line Wall from James' *History of the Herculean Straits* showing how the early medieval walls ended up being incorporated into later defences. This diagram is also of interest as it shows the location of a fountain that used to supply the townspeople with water. The aqueduct that supplied water for use in irrigation and to the ships in the port area, together with an underground cistern at Europa Point now known as 'Nuns' Well', originally date to the Islamic occupation of Gibraltar. (Courtesy of the Gibraltar Museum)

The southern walls of the citadel had several towers, most of them square, and a large gatehouse. The latter is attributed to the Nasrids; an inscription still in existence in the 18th century records its dedication to Yusuf I of Granada (1332–54). It provided the only direct access into the Qasbah. The walls themselves were originally made of poured tapia, which was a pinkish colour as it was made with the local red sand, and decorated with a pattern of white lime seams to simulate regular coursed masonry. Later constructions were of stone interfaced with brick and then rendered with tapia.

The southern flank is unusual in having survived relatively intact. However, the location of the citadel and walls was so well planned that, in the main, succeeding garrisons limited themselves to modifying and developing the existing defences. Recently the bases of the pillars supporting the north-east-facing Gate of Granada, the main entry point by land to the old town, have been excavated by the team from the Gibraltar Museum.

Elements of the western defensive wall have been excavated along Line Wall Road. These vestiges of the Merinid wall lie inside the parapet of the main British Line Wall and indicate later outward extension in British times. It is probable that early medieval foundations underlie most of Gibraltar's main defensive walls.



RIGHT Recent excavations have unearthed the remains of the Gate of Granada. The approach to this gate was via a gently sloping ramp that ascended the Rock's north-west face. Parts of it provided the foundations for the later northern defences. (Authors' photograph)

The Spanish defences

After falling to Christian forces in 1462, Gibraltar entered a slow decline into strategic obscurity. Although the fall of Granada and the end of the Reconquista would not happen for another 30 years, Gibraltar was of limited use as a friendly port and fortress. No longer a distinct entity from the surrounding hinterland, it became just another stronghold on a rocky promontory, caught up in petty rivalries of noble families and increasingly removed from world events.

The ninth siege of Gibraltar was a result of these internal squabbles; the forces of Juan Alonso de Guzman, Duke of Medina Sidonia, captured Gibraltar after a fifteen-month siege in 1467. He subsequently repaired the damage to the defences caused during the siege, provided a strong garrison and weaponry, including some guns, this being a time when the term 'artillerie' was often used to refer to both gunpowder and more conventional projectile devices, such as bows. Notwithstanding a grant of territorial jurisdiction issued to the subsequent duke in 1469, it was the King, Henry IV, who decreed the conditions for the garrisoning of the town. There were to be 450 men-at-arms (comprising cavalry, pike and crossbowmen) deployed at the castle, at the three gates to the town (Puerta de España facing the mainland, Puerta de la Mar facing out to the Bay and a further gate to the south), at the fort at the foot of the New Mole (Muelle Nuevo) called Torre del Tuerto ('tuerto' means 'one-eyed man') and on the two watchtowers to the south, outside the walls.

In 1486 Marbella replaced Gibraltar as the base from which to conduct the naval blockade of Málaga. Later on, increased naval activity stemming from Columbus' discovery of the New World in 1492 and Vasco da Gama's rounding of the Cape of Good Hope in 1498, led to increased maritime activity in Lisbon (to exploit the eastward route to India), Seville (for westward voyages to the Americas) and Barcelona (in the domination of the western Mediterranean). None of these activities needed a port at Gibraltar and it continued to decline as a fortress, although there was economic growth due to wine and tunny-fishing industries.

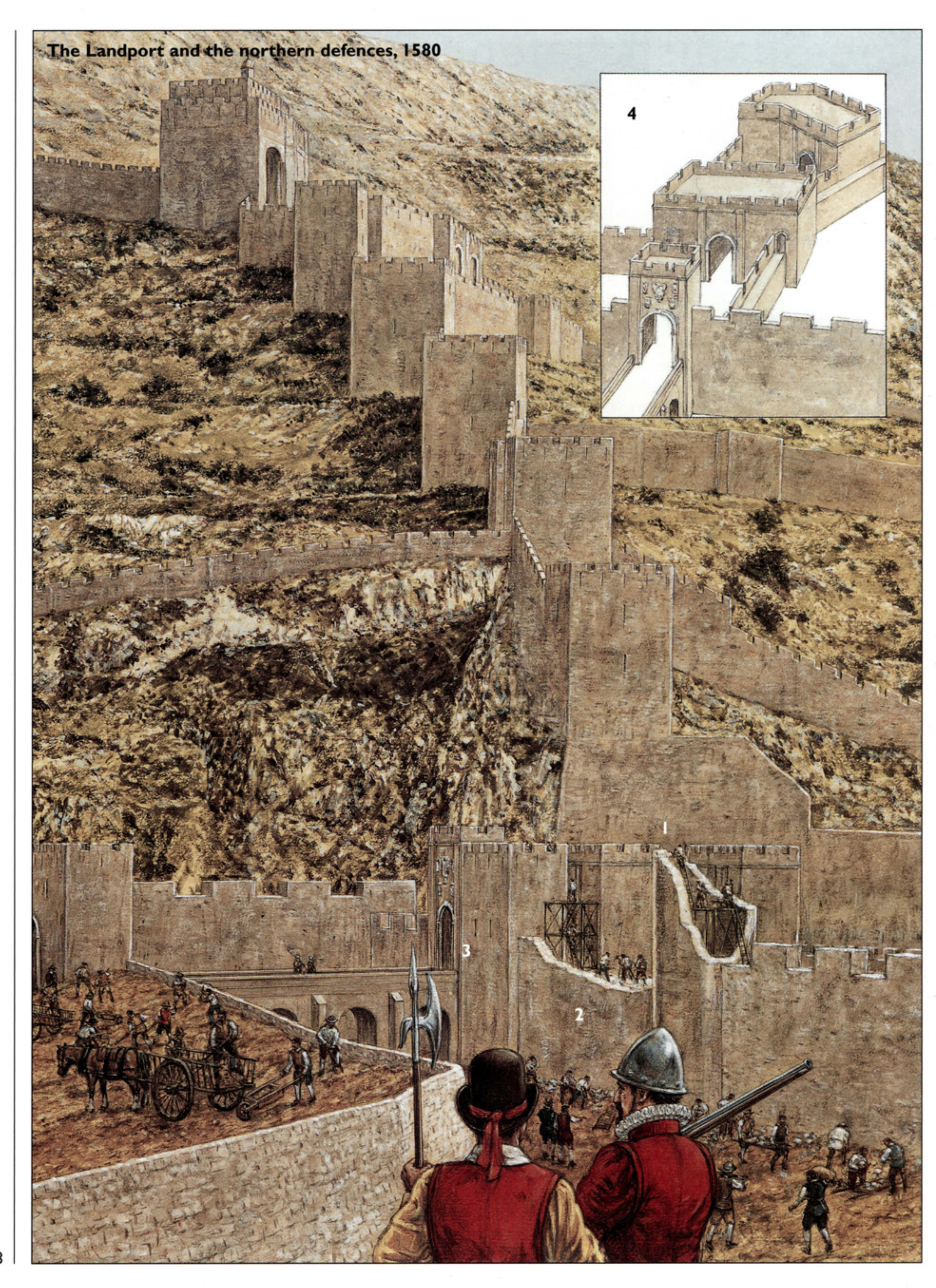
In 1501 the Spanish monarchs reclaimed the Rock from Medina Sidonia and the following year granted its coat of arms of a castle and key, in reference to its consideration as the 'key' to Spain. In 1506 Medina Sidonia made an unsuccessful attempt to recover the Rock for his family (the tenth siege) which led to the city being granted the title 'most loyal'.

Diego de Padilla, on September 5, 1534, mentions bringing to Gibraltar one reinforced demi-cannon, two (very good) demi-culverins, 300 iron shot, 21 quintals (hundredweight) of powder, and he ordered the purchase of six quintals of lead to make shot for ribaudequines & falconets; however, the defences still remained medieval in nature. In 1535 Alvaro de Bazan the elder, Captain-General of the galleys of Spain, warned the king of Spain, Charles I (Charles V was his title as Holy Roman Emperor), that the current defences were at least a century and a half old and totally inadequate in an age of heavy artillery. He recommended extending the Line Wall all the way round Europa Point and substantially strengthening the city's south wall. However, nothing was done.

Thus it was that on September 10, 1540 the Turkish corsair Hali Hamat, one of Barbarossa's captains, guided by an Italian renegade called Caramanli, led an attack on Gibraltar. Landing in the area of Europa Point, the pirates sacked the Shrine of our Lady, robbing it of all its valuables. After sacking the city, the

The advent of gunpowder and the bastion trace

Following the first effective use of gunpowder at the Battle of Algeciras, just across the Bay, in 1342, the use of cannon in siege warfare soon brought dramatic changes in defensive fortifications. The tall and relatively thinly crenellated battlements with towers at regular intervals, built for archery, gave way to the angular bastion trace; walls were lowered and thickened, and platforms and projecting bastions to flank each other and eliminate any 'dead ground' were built. To protect the walls from offensive artillery fire, these were often sunk behind a sloping glacis (often with additional defensive outworks to keep the enemy at a distance), which was separated from the ramparts by a large ditch. Cannon were placed in embrasures, and banquettes built between embrasures allowed soldiers to fire small arms over the parapet. Attackers would then be totally exposed to raking fire from the defenders and presented with a major obstacle before even reaching the main wall. In Gibraltar the Landport defences are a classic example of this system. The west-facing Line Wall could not have a defensive glacis as it was lapped by the sea. However, defensive outworks could be used to similar effect and this led to the construction of three counterguards to protect the North, Montagu and Orange bastions. Once built, they also provided places-of-arms in the space between the Line Wall and the counterguard where troops could assemble prior to a sortie. Their design was criticized by Gen Sir John Jones in 1841, but they represent an interesting attempt at providing protection to the main line of defence.


The Landport and the northern defences, 1580
4
1
2
3

The Landport and the northern defences, c. 1580
This illustration shows the Landport area during the 1580s, when the defences were being converted by the Spanish for use with cannon. A tower is in the process of being demolished (1), and embrasures are being built into a new, lower wall (2); this is taking place in the area of the Grand Battery, immediately next to the Landport Gate (3). In the background lie the city walls (later, the Castle Batteries) stretching up to the Tower of Homage. An inset (4) shows how the Landport Gate might have looked from the air; the coat-of-arms of Charles V (two-headed eagle and a golden fleece below) appears above the entrance.

pirates left with their treasure and captives, but were intercepted and defeated near Cartagena by a Spanish fleet under the command of Bernardino Mendoza, which led to many of the captives being freed. This incident prompted Charles V to send the Italian engineer Giovanni Battista Calvi to strengthen the defences of the Rock in 1552. Perhaps the most well known of Calvi's improvements is what is today known as Charles V Wall, which protected the city from possible future attacks from the south.

Philip II sent Giacomo Fratino in the 1560s to further develop the fortifications and he was probably responsible for a number of small bastions and platforms, including the Reduto de San Joachim (close to Willis's Battery), Baluarte de San Pablo (North Bastion), Plataforma de San Andres (on the site of the present-day Montagu Bastion) and a smaller bastion later incorporated into the Baluarte de Nuesta Señora del Rosario (South Bastion).

There has been some reference to the probability of Daniel Specklin (Speckle) designing some of the fortifications of Gibraltar. For example, although Charles V Wall was built in 1540, sketches by Anton van den Wyngaerde dated 1565 show a lower section of this wall without bastions and instead with some form of projecting gatehouse to the Gate of Africa. By 1627 both the bastions of Nuestra Señora del Rosario and Santiago (Flat Bastion) were built, and their trace is practically identical to that shown by Specklin in his book (including retired flanks, a favourite of Specklin) and there are close similarities in details of the Landport fortifications. Finally, Gibraltar is the only place referred to by name in his book's introduction as having its defences designed by Specklin.



An illustration from the *cédula* of Queen Isabella granting the coat of arms to Gibraltar. The key symbolizes Gibraltar's importance as the 'key to Spain'. (Courtesy of Stewart Finlayson/Gibraltar Museum)



The upper section of Charles V Wall showing its 'stepped' (*en cremaillère*) disposition, which allowed each face to receive flanking fire. Note also the steep cliffs at its base, making access to the upper Rock difficult. In Bravo's time it was called the Muralla de San Benito. (Authors' photograph)

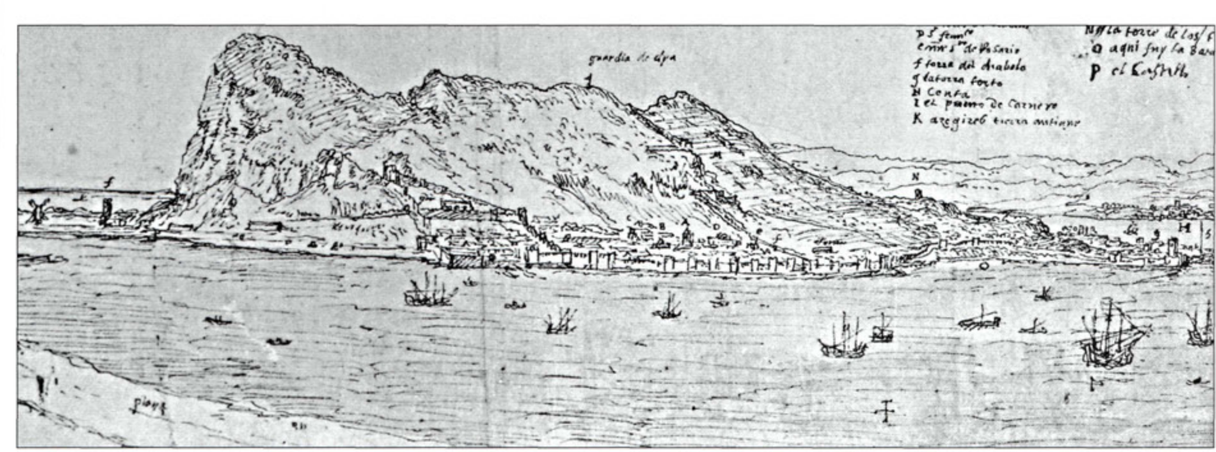
Perhaps the first comprehensive treatise on the fortifications of Gibraltar was produced by Don Luis Bravo de Acuña, dated 1627, at the request of King Philip IV. Philip IV himself paid a visit to Gibraltar in 1624, but complained bitterly when he had to enter the city on foot, as his carriage could not pass through the Landport Gate (Puerta de España). Luis Bravo, by then Governor of Gibraltar, is reputed to have answered: 'Sir, the Gate was not made for the passage of carriages, but for the exclusion of enemies.'

Throughout his report, Bravo maintains that the defence of southern Spain cannot be solely carried out by the navy unless there are strong fortifications along the coast itself. He presents the system of fortifications existing on the Rock at this date and provides detailed descriptions of three main fronts, including both completed and proposed works:

1. The North Front which faces Spain and gives way to the isthmus. This shows a well-bastioned land front with the Muralla de San Bernardo (later Grand Battery) now fully adapted for cannon, although still rather narrow. A number of additional walls and redoubts defend the landward approach and both its gates, Villavieja (formerly Granada) and España, and a ditch with coveredway is present. The Old Mole is shown, and given that there is no evidence of this structure in Wyngaerde's 1567 sketches, problems with silting must have been acute, for by 1618 the New Mole was being built.

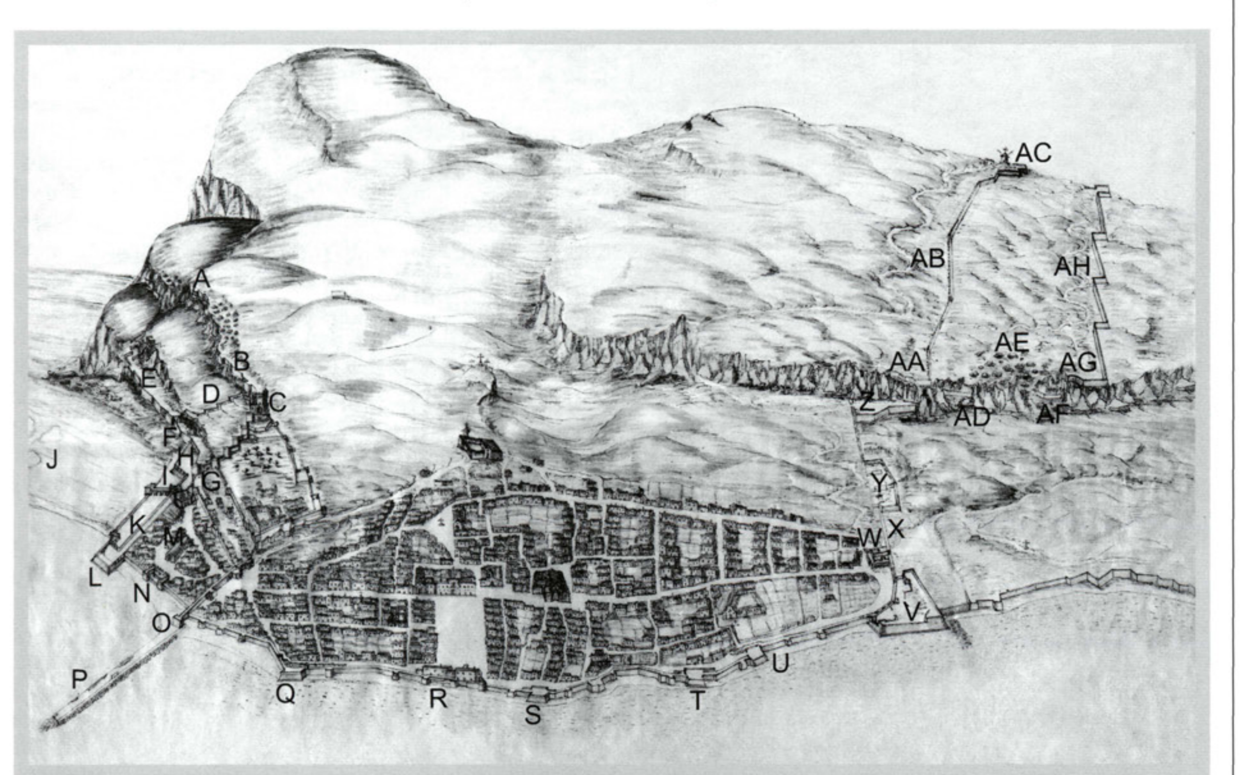


BELOW RIGHT The retired left flank of the present-day South Bastion showing casemated gun positions that would enfilade the ditch across the Gate of Africa. The painted date on the left orillon (1540) is too early and should only refer to Charles V Wall. (Authors' photograph)



BOTTOM A sketch by Anton van den Wyngaerde drawn in 1567. It shows the walls of the Rock still essentially medieval in nature, peppered by many tall towers from which archers could command the defended ground and adjoining wall walks. The original citadel formed by the castle defences is clearly visible, as is Charles V Wall further to the south. The Tuerto Tower and its fort at the New Mole (labelled 'g la torre torto') can be seen at the far right. (Courtesy of the Austrian National Library, Vienna)

2. The Bay or Western Front, between the Old and New Moles. This shows how the Line Wall had been reinforced with a number of artillery platforms and a large bastion at its southern end (Nuestra Señora del Rosario). The latter, together with the Baluarte de Santiago, protected the new Africa Gate. The Baluarte de Santiago is a flat bastion, with its faces almost parallel to the curtain wall on either side. Other redoubts and walls along the cliffs above the southern approach add to the defences. A second wall (Muralla de San Reymondo) can also be seen behind upper Charles V Wall and acting as a retrenchment to it. Up until recently referred to as the Moorish Wall, it is now known to date from the late 16th century and is called the Philip II Wall.



Combined plan and elevation of Gibraltar by Don Luis Bravo de Acuña, dated 1627
A – Reduto (redoubt) de San Joachim.
B – Muralla (wall) de San Ignacio, probably built by Don Álvaro de Bazan, Mayor of Gibraltar, whilst in residence at the castle.
C – Tower of Homage (Bravo calls it 'Torre de la Vela').
D – Muralla de San Joseph with Reduto de San Luis at its base.
E – Covered (as in 'protected') access track to the town.
F – A set of double gates along E, beyond which the Muralla de San Joan protects the access track.
G – Puerta (gate) de la Villa Vieja (formerly 'de Granada').
H – Baluarte (bastion) de San Pedro (later Hesse's Demi-Bastion).
I – Puerta de España, with its stone bridge and double gates.
J – The morass.
K – The Muralla de San Bernardo with its ditch and coveredway.
L – Baluarte de San Pablo (later North Bastion).
M – The galley house or Atarazana (although no longer tidal).
N – Puerta de la Mar (Sea Gate).
O – Plataforma de San Andres (site of present-day Montagu Bastion).
P – Muelle Viejo (Old Mole).
Q – Plataforma de Santa Ana (present-day Orange Bastion).
R – Puerta de Mudarra (just south of present-day Zoca Flank).
S – Plataforma de San Lorenzo (site of the present-day King's Bastion).
T – Plataforma de San Diego (site of present-day Wellington Front north demi-bastion).
U – Plataforma de San Francisco (site of present-day Wellington Front south demi-bastion).
V – Baluarte de Nuesta Señora del Rosario (South Bastion).
W – Puerta de Africa.
X – Fosso (ditch) protecting lower Charles V Wall.
Y – Baluarte de Santiago (Flat Bastion).
Z – Reduto de San Philipe (later Lower Genoese Battery).
AA – Reduto de San Agustin (later Upper Genoese Battery).
AB – Muralla de San Reymondo (Philip II Wall).
AC – Nuestra Señora de Guadalupe (site of the Islamic windmill and later Signal Station).
AD – Muralla de San Justo.
AE – *Peñascos* (others can be seen between A and B).
AF – Muralla de San Pastor.
AG – Reduto de San Domingo.
AH – Muralla de San Benito.



ABOVE The present-day Southport Gates. This was the location of the first gate of the 17th-century Puerta de Africa. Above it are the arms of Charles V (Charles I of Spain) and the columns on either side carry scrolls which read 'plus ultra', in direct reference to the Pillars of Hercules. On the bottom left are the arms of Gibraltar and to the right the arms of the then Spanish Governor. (Authors' photograph)

3. The Southern Front up to and including Europa Point. A seawall mainly along cliffs forms the main defence, with a redan and a number of platforms for musketry, little improved from an essentially medieval structure. A half-moon battery provides protection to the anchorage behind the New Mole, as does the improved New Mole Fort with its Tuerto Tower, although Bravo was still not happy with it.

Bravo considered the Eastern Front, with its steep cliffs, to be virtually unassailable. He refers to existing artillery as *pedreros* or *petardos* (with occasional reference to specific pieces such as demi-culverins) and although he talks of both muskets and arquebuses, Bravo suggests that crossbows could be used in the defence of the fortress. He also describes the use of *peñascos* (also called *galgas*) to defend high cliff areas along the front of which enemy troops could attack; these were large rocks (the size of a litter) so prepared that they could easily be triggered by one man to roll down across attacking troops. A number of these covered the northern approach towards the Landport defences and the Red Sands towards the lower section of Charles V Wall, and can be seen clearly in his plans. Similarly he mentions hoardings built along the walls between the various doorways of the Puerta de Africa (now Southport Gates) containing quantities of large rocks that could be dropped onto attacking troops.

One of Bravo's concerns is the large separation between the two main areas that needed defending, the New Mole Fort and the main town, mainly because of a lack of troop numbers. In an attack this would inevitably mean having defenders running between outposts, with a large proportion of these being local inhabitants, although Bravo promises his reader that Gibraltar's defence can be assured with fewer troops than might at first seem to be required, as long as vigilance and a state of readiness is maintained.

He also stressed the importance of and need to maintain port facilities. He urged the completion of work on both the Old and New Moles, and highlighted the need to both redesign and reinforce the New Mole Fort, as he considered that 'in an offensive the enemy cannot be allowed to set foot on the New Mole, even if this means its destruction, and its means of defence need to be established.'

Bravo even suggested the creation of a hornwork to better defend the Mole, but this aspect of his proposals was not implemented, as work on the defences of Cadiz, the new pivotal point in the political, military and naval strategies of the region, was considered a higher priority. Apart from the construction of Martello-type lookout towers along the coast, further inactivity over the next 66 years led to the defences becoming increasingly inadequate. When an Anglo-Dutch fleet under Adm Sir George Rooke entered the Bay in 1693, escorting a convoy of merchantmen that was under attack by a French fleet, Rooke anchored off the New Mole and used his ships to protect the merchantmen huddled under cover of the sea wall. The poor state of the defences at the New Mole Fort was such that Rooke ordered the landing of guns from four of his ships to supplement the eight pieces there. It is perhaps not surprising to note that it was at this very point that marines managed to land on Gibraltar and thus take the city only 11 years later, under the command of the very same admiral.

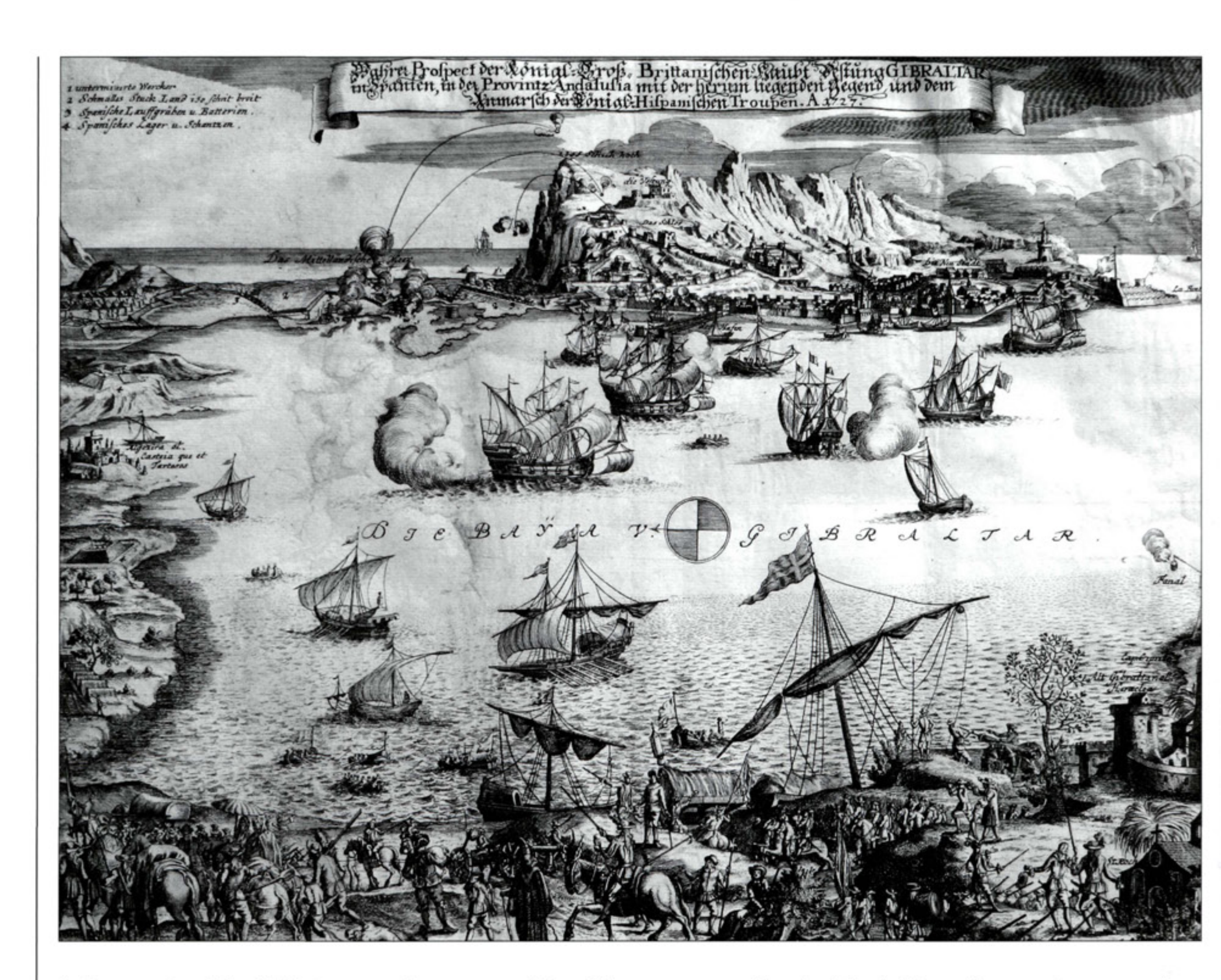
The 18th-century British fortifications and the Great Siege

The Anglo-Dutch fleet that entered the Bay of Gibraltar on August 1, 1704 (NS) during the War of the Spanish Succession was commanded by Adm Sir George Rooke along with his ally, Prince George of Hesse d'Armstadt, and formed part of a naval expedition in support of the Hapsburg Archduke Charles of Austria, pretender to the throne. A three-pronged attack was planned on the fortress. A force of marines under the Prince of Hesse was landed on the isthmus with the intention of severing any communication between the Rock and the mainland, and to stop any Spanish reinforcements from reaching the Rock by land. Secondly, more marines were landed around the New Mole Fort, creating another front with which to stretch the few enemy defenders even further. Thirdly, Rooke placed his warships in front of the city walls and its strong defences with the intention of using their cannon to bombard them and the town, if necessary.

Hesse then sent an ultimatum to the Spanish governor of Gibraltar, Don Diego de Salinas, demanding that he surrender. Salinas refused and the bombardment commenced on the morning of the 3rd. Simultaneously, Rooke ordered his forces to capture Gibraltar's main sea defences, which included the Old and New Moles, with the fortified Tuerto Tower. During the attack on the New Mole Fort, either a mine was set off or a magazine exploded, causing

This print depicts English and Dutch marines, from six different regiments, leading the assault on Gibraltar under the command of Prince George of Hesse. These marines landed on the isthmus north of the city, with a second party landing at the New Mole Fort. The bastion that can be seen in the picture is the Baluarte de San Pablo (later North Bastion). (Courtesy of the King's Own Royal Regiment Museum, Lancaster)





A German print of the 1727 siege shows Gibraltar under attack. The tall ships in front of the Rock are British. They are shown in the act of exchanging fire with the Spanish battery in the foreground. The smaller ships with triangular lateen sails are probably Spanish. Of particular interest are two galleys in the left foreground. Two others are moored and appear to be taking on either troops or supplies. Although they were no match for the tall ships, given the variable wind conditions in the bay, oared craft would have been better suited for moving men and materials, as they are not affected by the vagaries of wind speed and direction. (Courtesy of the Gibraltar Museum)

heavy casualties. However, once the fort had fallen, the marines were in a perfect position to intercept many of the town's women and children who had escaped to Europa at the commencement of hostilities. Few full-time professional soldiers manned the fortress and many of the defenders were local inhabitants, who would have been severely distressed to see their families fall into the hands of soldiers. Doubtless this had an important effect on the outcome of the conflict, and, together with the realization that the town was no longer defensible, the terms of surrender were accepted. The Prince of Hesse, in the name of Archduke Charles, took possession of the Rock on August 4, 1704.

When the Anglo-Dutch force captured Gibraltar, they inherited a series of essentially medieval fortifications, which had been brought up to date by the Spanish. Almost immediately, the Spanish laid siege to the fortress, but this was unsuccessful. The Treaty of Utrecht was signed in 1713. The most important and influential aspect for Gibraltar was Article X, in which Spain ceded Great Britain[3] 'the full and entire propriety of the town and castle of Gibraltar, together with the port, fortifications, and forts thereunto belonging ... for ever, without any exception or impediment whatsoever.'

Although initially Gibraltar was considered as just one more piece on the chessboard of European dynastic politics, public opinion in Britain was increasingly warming to its role, being described by a pamphleteer as 'a plaguey thorn on the side of the old Christians as all true Spaniards style themselves.'

3 The Act of Union was passed in 1707.

Thus it was that another siege followed in 1727. However, the British were in command of the sea and therefore the presence of their fleet in the Bay ensured that the garrison was never in dire need of supplies. Thus this 17½-week-long siege developed into a bitter contest between opposing gunners and sappers (miners). One of the most notable events was the attempt by Spanish forces to dig a mine by expanding a cave on the north face of the Rock under Willis's Battery. By the time the siege ended, only a few metres had been dug into the hard limestone. A walled-up cavity, reputedly the mine, can still be seen on the north face of the Rock.

In the first few years after 1704, the British did little more than upgrade and maintain the existing structures, but as the 18th century progressed and it became clear that Spain wanted to regain possession of the Rock, the bringing of the defences of Gibraltar up to scratch became a priority. The Muralla de San Bernardo, now renamed the Grand Battery, was strengthened, as were most of the Landport and northern defences. The morass was excavated to create an inundation, leaving only two narrow approaches to the city: one was along the base of the scarped cliffs at the base of the Northern defences; the other, known as 'the Strand', was a narrow causeway with water on both sides. Both were guarded by barriers, Forbes's (guarded by a fleche) and Bayside, respectively. The Devil's Tongue Battery on the Old Mole provided an extension of the Landport defences. In 1761, Major William Green, already a veteran of several campaigns, was sent to Gibraltar as Chief Engineer. The King's and Queen's Lines along what had originally been the access path up to the Gate of Granada, and the Princes' Lines above these, were repaired and improved. Scarping made it impossible to climb the face of the Rock. A line of chevaux-de-frise ran across the inundation. The glacis was improved by the addition of places of arms to the coveredway and a ravelin-shaped Couvreporte Battery, based on Vauban's first system, protecting the entrance to the fortress, the stone bridge having been replaced by a wholly wooden structure with drawbridge. The South Front had already been strengthened a few years before with additional guns mounted on the South Bastion and Prince of Wales Lines constructed, running from the glacis of the Front to the New Mole, an early form of retired battery. The South Front was improved with redans and additional guns. The sea walls all the way to Europa were repaired and improved. In 1771 an experimental fougasse, Healey's mortar, was test-fired.

Green not only oversaw the modification of the Line Wall defences and building of barracks, bomb-proofs, store-houses, hospitals and magazines, but also proposed and designed a large bastion in the centre of the Line Wall which would help defend it. This would eventually be called the King's Bastion, and it would play a vital role in the defence of Gibraltar during the Great Siege.

The King's Bastion was constructed on the line of the Line Wall fortifications, the foundation stone for this bastion being laid in 1773. It was a large, classic bastion projecting boldly from the curtain wall built between the original Bombhouse and Eighth (also called Three Gun) Batteries in the tradition of bastion fortification that had dominated military architecture for

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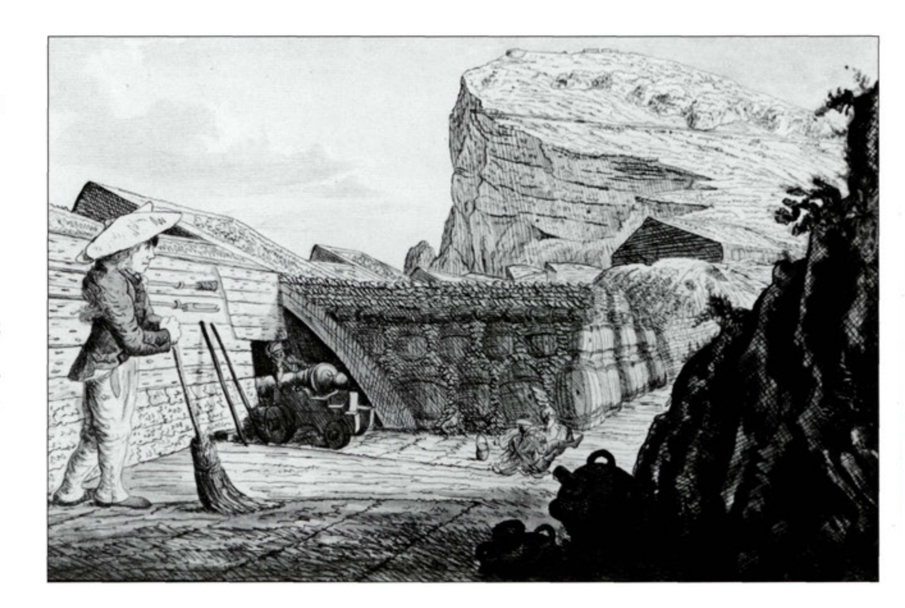
The King's Bastion during the Great Siege 1779–83

The 'Grand Attack' of the floating batteries on the King's Bastion took place on September 13, 1782. This was a combined Spanish–French attack using specially converted ships ('floating batteries') that had been adapted to withstand heavy shelling, anchored some 500m or so off the Rock. The ships were designed by the eminent French engineer Jean Claude le Michaud d'Arcon, and sported specially reinforced hulls, irrigation pumps to quench any fires, and pitched roofs to protect against plunging fire from shot (as shown in the upper right inset illustration). The floating batteries were intended to support a combined land and sea assault on the Rock, and were thought to be unsinkable. The garrison quickly learnt that red-hot shot was highly effective against the floating batteries, and all the ships were eventually destroyed by fire. The King's Bastion played a pivotal role in the attack; a plan view of the bastion is provided in the lower right area, showing the locations of the casemates below the terreplein.

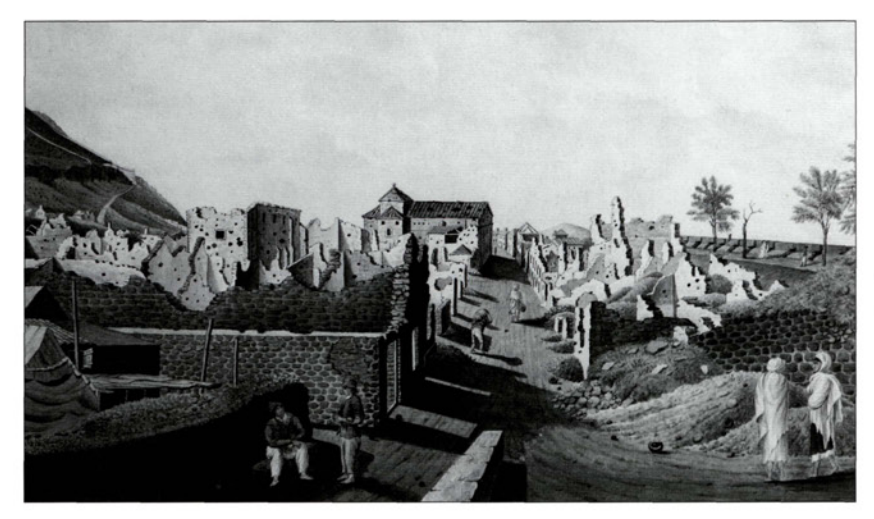

The King's Bastion during the Great Siege 1779–83



The defences at the northern end of Gibraltar during the Great Siege, and the Spanish siege lines.



TOP Watercolour by Lt George Koehler, RA of Princess Amelia's Battery, one of the Willis's Batteries. At a height of 440ft above the isthmus, these batteries were built on the site of the earlier Reduto de San Joachim and dated from early in the 18th century. The picture is interesting for its attention to detail. The soldier sweeping in the foreground has his long hair loose and unfloured (Eliott had stopped this practice when flour was already in short supply for making bread). A bored artilleryman rests on the barrel of his gun. The tools of his trade are neatly racked on the wooden planking that lines the parapet. It appears that earthen ramparts have been erected above lower masonry walls to provide additional protection. Barrels (these were cheaper than gabions) are stacked together to form an abutting shelter, and small stones are used to infill gaps and roof it. A large magazine, further out of range of enemy fire, may be seen in the background. (Courtesy of the Royal Artillery Historical Trust)



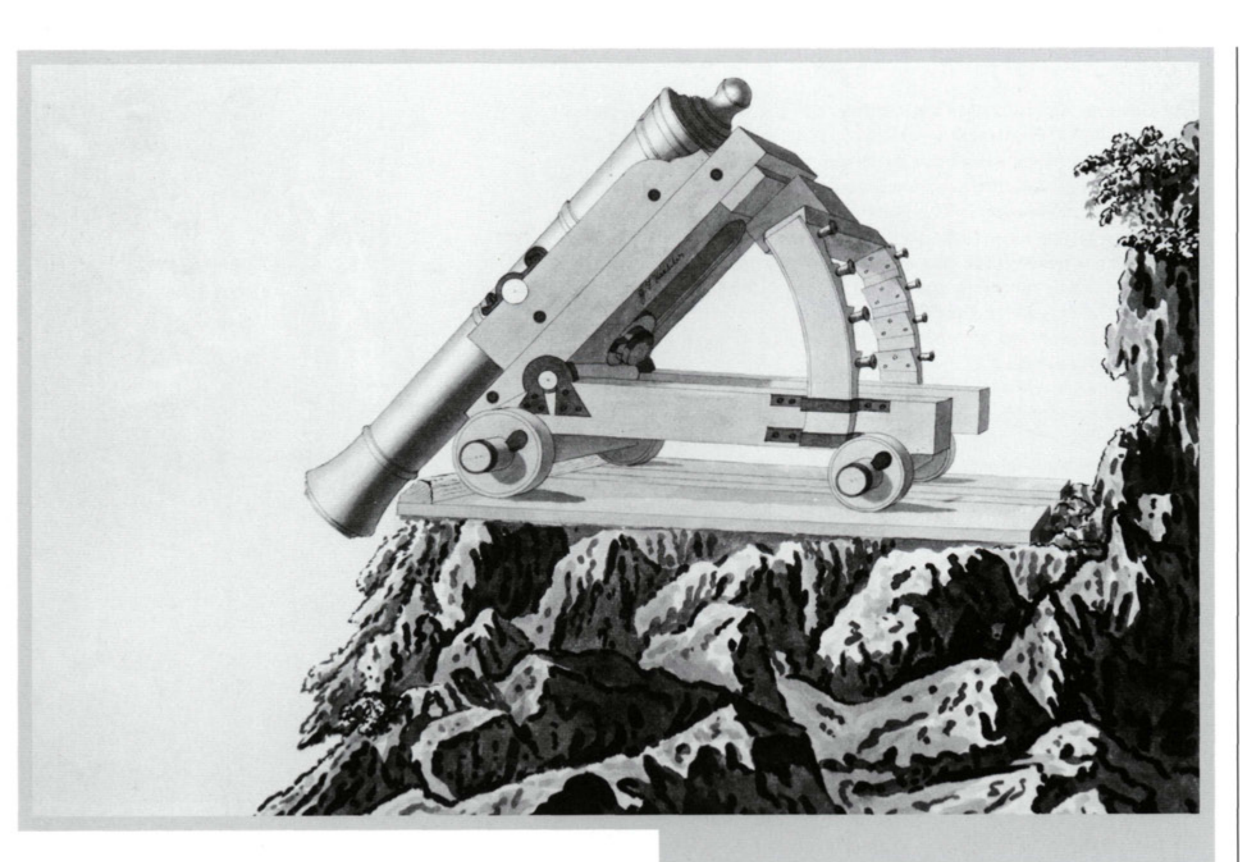
RIGHT Following the Great Siege, Gibraltar was left in a terrible state. Because the town had been built mainly on the lower slopes of the Rock it came within easy range of the Spanish cannon. Col John Drinkwater, wrote: 'The buildings in town, at this time, exhibited a dreadful picture … Scarce a house north of Grand Parade was tenable; all of them were deserted. Some few, near South-port, continued to be inhabited by soldiers' families, but in general the floors and roofs were destroyed and the bare shell only left standing.' (Painting by Capt Davis, 1793, courtesy of the Gibraltar Museum)

more than 250 years. Although it was soon out of date, giving way to the new ideas of the innovative French engineers such as Montalembert and d'Arcon, when built by the British it was a bold architectural gesture with its curved faces. It provided a strong point on the long front of the Line Wall and enfilade fire along the wall from its flanks.

The Great Siege of Gibraltar can be considered in six phases:

1. Early blockade from June 23, 1779 to the relief by Rodney on January 21, 1780;
2. Renewal of the blockade to the second relief by Darby on April 12, 1781;
3. Sustained bombardment until the Great Sortie by the British on November 27, 1781;
4. Renewal of the blockade and bombardment until the 'Grand Attack' of the floating batteries on September 13, 1782;
5. Renewed blockade until relief by Howe on October 13, 1782;
6. Continued blockade until peace signed on February 2, 1783.

Throughout this siege Gibraltar was ably commanded and administered by Gen Sir George Augustus Eliott, an experienced officer well suited to the hardships imposed by the siege.



During the siege many works continued to be carried out: new batteries (Green's Lodge, Royal and Rock Guard) marked the north face all the way to the summit, and Orange Bastion, in its present form, was constructed. A cavalier was erected atop Montagu Bastion.

Perhaps the most notable defensive achievement of the Great Siege was the construction of the galleries, which started out as a plan to place a single gun, or at least a sentry post, atop a projection on the North Face called 'the Notch'; it culminated in an elaborate network of tunnels mounting casemated guns along most of their length.

Drinkwater, in his account of the Great Siege, states in reference to the galleries:

> *The communication or Gallery leading to St George's Hall, above Farringdon's Battery; two works with the same nature under the Queen's Battery [Willis's] the Union Gallery [later extended by O'Hara to communicate with the Prince's Lines] and in the rock above Prince of Hesse's Bastion; are so singularly contrived, and of so formidable a nature, that all direct attacks by land, henceforward may be considered as quixotism and insanity.*

By the time the Great Siege was over, Gibraltar had moved from being a pawn in the European dynastic power games to becoming a strategic fortress in Britain's growing empire – a sentinel that would guard the gateway to the Mediterranean.

The Koehler Depressing Carriage

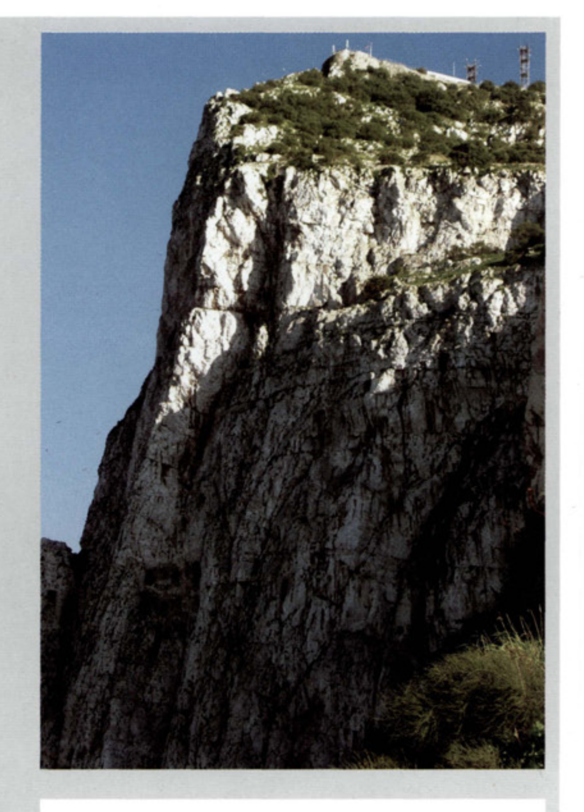
Human inventiveness and resourcefulness is often expressed in times of stress, and the Great Siege was no exception. In 1782 Lt George Frederick Koehler, RA designed the depressing carriage. Although the Rock's gunners enjoyed the advantage of increased range and view of the enemy, given their elevated position, this also created problems, especially when the enemy was close and existing carriages would not allow the degree of depression required to be able to shoot down at the attackers. Koehler's depressing carriage was an ingenious solution to the problem. The idea of a depressing carriage was not in itself a new one, but what Koehler achieved was a practical and innovative design. The carriage itself was essentially a garrison carriage split horizontally into two sections that were hinged by a spindle at the front. This spindle allowed the gun to be depressed, with suitable wadding holding the cannonball in the bore. When it was first tested against a traverse in the San Carlos Battery, it scored 28 hits out of 30, an excellent result for its time. The main innovation was in the design of a sliding carriage upon which the gun itself was mounted. This allowed the gun itself to recoil upwards, rather than the entire carriage, as had hitherto been the case. This principle went on to be incorporated into many modern guns. A further advantage of this sliding bed for the gun was that it was attached to the main body of the carriage via a second, vertical spindle. This allowed the bed to rotate sideways and thus allow the gun to be reloaded in comparative safety without requiring gunners to move in front of it and expose themselves to enemy fire. The picture shown is by Koehler himself and is reproduced courtesy of the Royal Artillery Historical Trust.

The Galleries and 19th-century tunnels

The Galleries are situated in the north face of the Rock. As the Great Siege developed, the Spanish were able to push forward their lines so that it became impossible for the British to train their cannon on them. It was realized that a cannon mounted on a projection on the North Front cliff known as 'The Notch' would fulfil this objective, but the task of getting a gun there appeared impossible. Sgt Maj Ince of the Military Artificers took up the challenge and suggested that this could be done by tunnelling and driving a gallery (the Upper or Windsor Gallery) within the North Face of the rock leading to the Notch. Permission was granted and work ordered to begin with Ince in charge of the project.

Tunnelling was carried out using sledgehammers and large chisels, with powder charges being exploded within the channels cut into the rock. Work began on May 25, 1782 and it took 13 men five weeks to drive a tunnel eight-feet-square 82ft into the rock. Given that the fumes and dust from blasting were taking progressively longer to clear, it was decided to create an opening in the Rock to the outside of the north face to provide a means of ventilation. It was immediately realized what an excellent position this would be for a gun and, as successive embrasures were opened up, guns were mounted; by the end of the Siege there were four guns mounted along the gallery. By the end of 1783 the Upper Galleries ran approximately 908ft. Each cannon embrasure was fitted with an iron curtain rail from which a curtain of woven ropes was hung (a mantlet) to protect the gun and detachment from splinters or burning material entering the casemate. After the Siege, the miners continued with their tunnelling and eventually reached the Notch, which they hollowed out, and installed a battery of seven guns in it, named St George's Hall. Lower and Middle Galleries were also excavated during this time with rises, such as Thompson's and Farringdon's, interlinking them and other chambers within the complex.

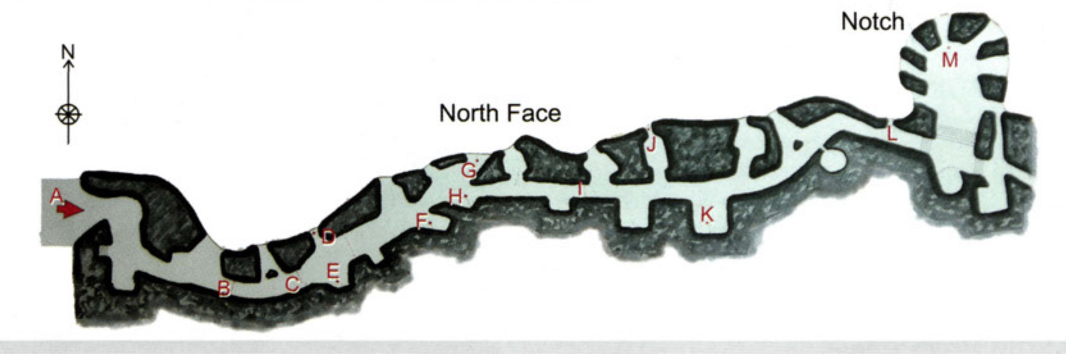
The original idea of mounting a single battery at the Notch was now superseded by the idea of mounting a whole series of guns along the north face. By 1790 an unprecedented 4,000ft of tunnel had been excavated, and nearly half a million cubic feet of rock extracted from the tunnels themselves. Eventually an underground network of fortifications evolved to aid in the defence of Gibraltar. These and other works were constructed by The Company of Soldier Artificers created by Green in Gibraltar under a Royal Warrant dated March 6, 1772. At the time the Corps of Engineers consisted only of officers, so labourers and tradesmen (such as stonecutters, smithies, masons, miners, limeburners, carpenters, gardeners, wheelwrights and coopers) had to be found from locally employed civilians and were not subject to military discipline. In 1786 a second company was added and in June 1797 both companies were incorporated into the Royal Military Artificers (created October 10, 1787). In 1813 they became the Royal Sappers and Miners. Finally on October 17, 1856 they were amalgamated with the Royal Engineer Officers to become the Corps of Royal Engineers.



Key

- A Work commenced May 25, 1782.
- B July 4, 1782. 120ft in six weeks.
- C August 5, 1782. 60ft in four weeks.
- D 1st embrasure emplacement.
- E Area later enlarged to take recoil of cannon.
- F Tunnel started here. Later considered too far from outer face.
- G Line of tunnel direction too near cliff face. Work stopped.
- H Tunnel finally started here.
- I December 6/12, 1782. 180ft in four months.
- J 7th emplacement.
- K Old Magazines January 14, 1783. 140ft in four weeks.
- L May 11, 1783. 100ft in 6 weeks.
- M St George's Hall. June, 1783.

Note: The Notch and Cornwallis Hall were completed about 1784/85.



'Strong as the Rock': Gibraltar and the British Empire

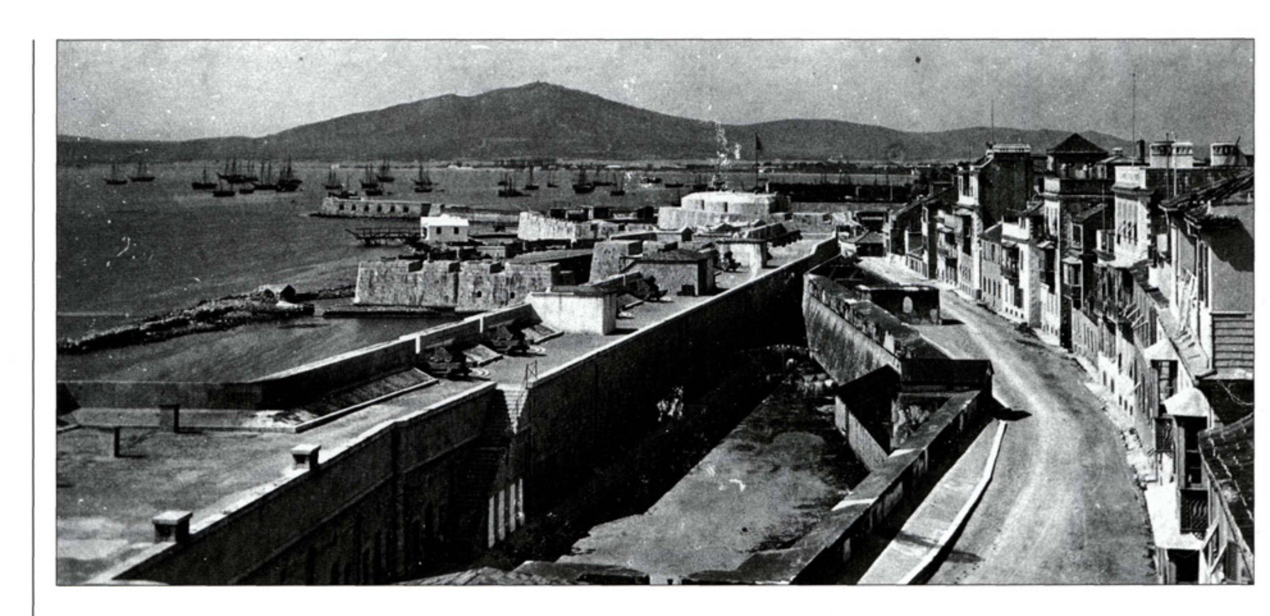
Work continued unabated on the defences after the Great Siege: the galleries were extended and the Orillon Battery, a three-storey gun position in a natural fault in the rock, was added to the Northern Defences.

William Green continued to be closely involved in the development of the fortifications, which would not have been an easy task given the disparity of opinions being voiced. The Waterport Front was extensively developed in the 1790s. Both Montagu and Orange Bastions were enlarged substantially and counterguards were constructed in front of them. A counterguard was also built to protect the North Bastion. The purpose of a counterguard is to act as an outer line of defence and a cover against bombardment of the bastion behind, whose shape it mirrors. In an attack the counterguard would have to be breached and captured first, thus slowing down an enemy assault. Although it should have carried, by convention, the same name as the bastion it covered, the name of the counterguard at Orange Bastion was later changed to Chatham. The counterguard in front of North Bastion is officially North or Northwest Counterguard but confusion with the name of the area between the Bastion and counterguard has meant that most people know it as West Place of Arms. It even has this incorrect name boldly painted on the exterior wall. All three counterguards were joined by tenailles to form a protective envelope surrounding the main bastions. Moreover, Montagu and Chatham also had rubble breakwaters constructed in the sea as obstacles to an amphibious assault, giving these defences a double ditch.

The Grand Casemates bombproof barracks were built in 1817. The next significant evolution in Gibraltar's defences came in 1841 when, given the steady increase in steamships plying the shipping lanes, Gen Sir John Jones was sent to the Rock to assess and report on the necessary modifications to the defences and artillery. His recommendations set the pattern for the defensive system of Gibraltar for many years to come. Most of the white ashlar limestone walls along Line Wall are the result of his modifications. In several places the



Prince's Gallery forms part of the Lines of the same name, leading to Hanover Gallery to the west. The Prince's Lines are part of the Northern Defences and run above King's and Queen's Lines, all of which flanked the landward approaches to the city. (Authors' photograph)



ABOVE Jones's straightening of the Line Wall in the area of Zoca Flank (seen at lower left) meant that the earlier Line Wall survived intact, acting as a retrenchment to Prince Albert's Front, seen clearly with its guns, traverses, and expense magazine. Orange and Montagu Bastions, their counterguards and the Devil's Tongue lie behind. A rounded structure can be seen projecting from the re-entrant angle of the early Line Wall. This is a medieval round tower which had been cut down to form a gun platform. The area between the walls is now an underground car park, but the tower is still there. (Courtesy of the Gibraltar Museum)

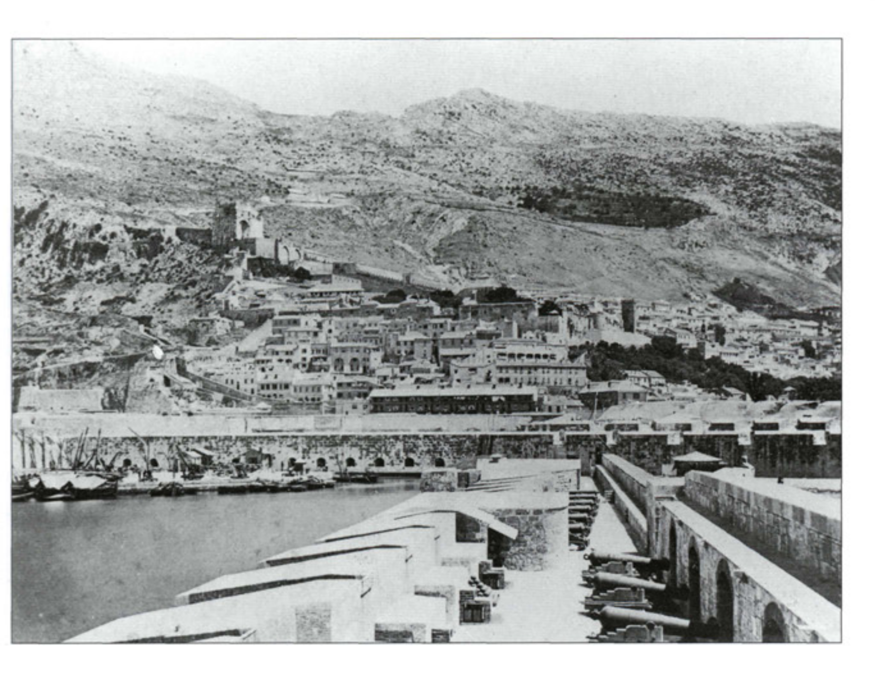


RIGHT A 19th-century photograph of Raglan's Battery, one of the retired batteries proposed by Gen Sir John Jones. The traversing carriages ran along racers and were fixed to a pintle at the front, thus allowing them a rapid traverse when tracking a target such as a ship. (Courtesy of the Gibraltar Museum)

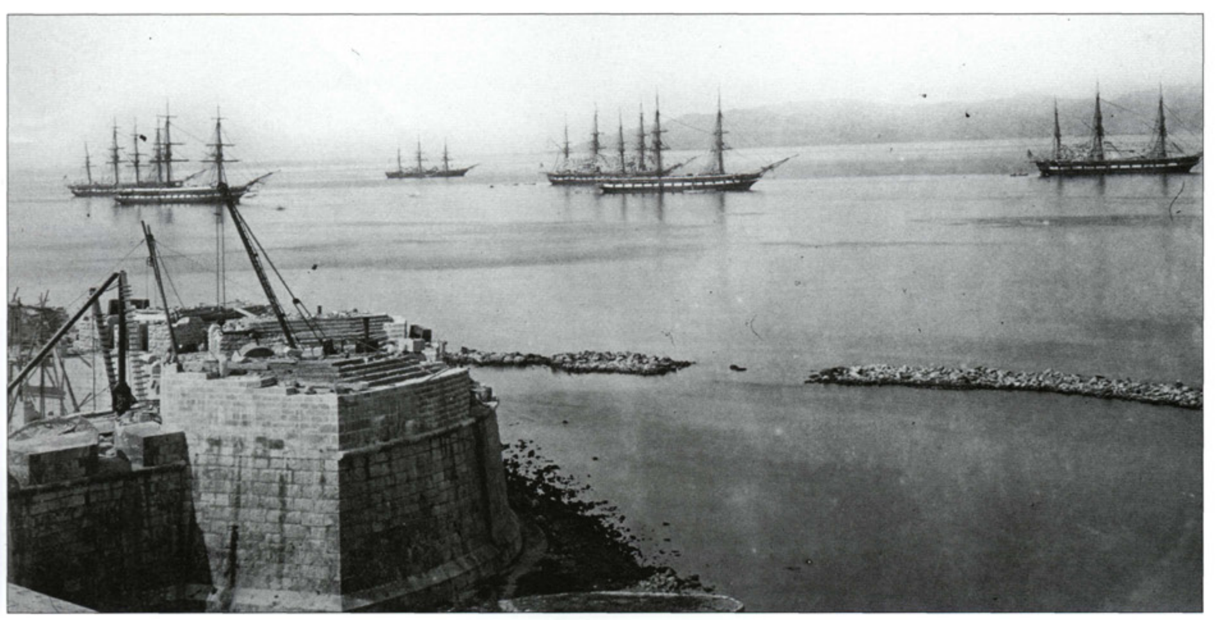
Line Wall was actually re-sited, as happened when Prince Albert's Front and Zoca Flank Battery were constructed. In the King's Bastion defensible barracks were built spanning the gorge.

New defences, such as Wellington Front, were added. This advanced front or hornwork was named after Field Marshal Arthur Wellesley, first Duke of Wellington (1769–1852), and was applied to the entire curtain wall that stretched between King's and South Bastions. Originally named Wellington's Front, it consisted of two demi-bastions flanking a curtain wall mounted with heavy guns and containing casemated troop accommodation. Sir John also recommended the construction of the Retrenched Barracks at the head of Windmill Hill and a defensive line from there to Buena Vista.

Artillery was also enhanced, with the more accurate and longer-ranged rifled muzzle loaders (RMLs) progressively replacing the older smooth-bore muzzle-loading cannon. Perhaps his most important proposal was the introduction of retired batteries further up the western side of the Rock, which not only increased the effective range of the guns but also made them more difficult to



By 1864 a number of guns had been turned round within Devil's Tongue Battery to cover the harbour area. Note the unvegetated state of the Upper Rock, caused by many years of logging for building material and firewood, and kept down by herds of goats. The darker patch was a private farm. The vegetation of the Upper Rock has now been allowed to grow back and is a nature reserve. (Courtesy of the Gibraltar Museum)



The King's Bastion being reconstructed to take four 10in. and one 12.5in. rifled muzzle-loading guns. c.1874. (Courtesy of the Gibraltar Museum)

spot by an attacker. This led to the construction of Jones's, Civil Hospital and Raglan's Batteries. Later these were joined by Gardiner's, Queen Victoria's, Lady Augusta's, Prince of Wales and Cumberland Batteries.

The counterguards were criticized by Jones. He pointed out that these were only 18in. lower than the curtains and bastions they covered so they obscured their line of fire, making it impossible to serve both batteries at the same time. Also, the space between their counterscarp walls and those behind (45ft) was too narrow to be properly defended. This meant that a successful defence would depend on the holding of the counterguards. Unfortunately, once built, it was difficult to radically modify these, so Jones reluctantly proposed the introduction of casemated guns to cover the ditch. The casemates can still be seen. His other recommendation was for the use of musketry fire to enfilade the curtain walls leaving the large guns to engage enemy ships.

RIGHT Detail of Wellington Front as shown in the 1865 Rock model. In a similar manner to Prince Albert's Front, the earlier Line Wall can still be seen running behind the front. It sports 14 embrasures, four flanking the curtain walls on either side of each demi-bastion and six firing out from the curtain wall between. Note the rubble breakwaters, which acted as a further obstacle to attackers. (Courtesy of Stewart Finlayson/Gibraltar Museum)

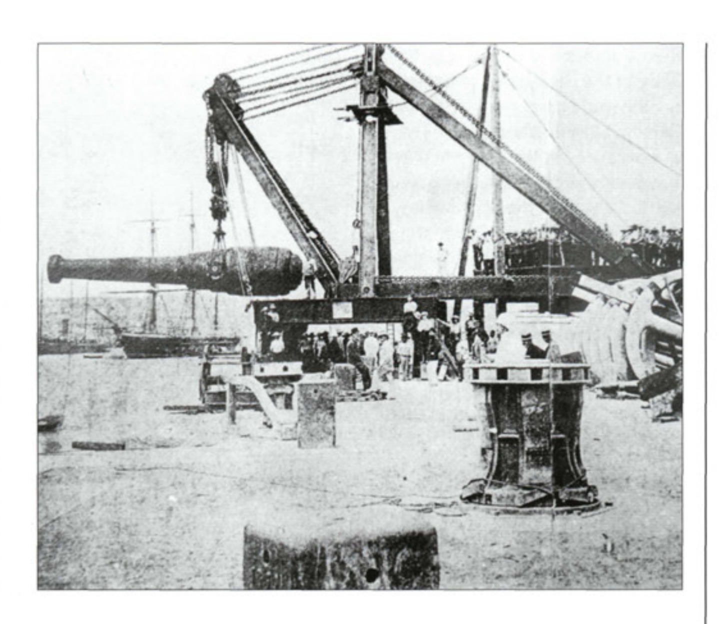


BELOW Parson's Lodge coastal fort today. Originally the 9th Rosia Battery, it grew to mount three 10in. 18-ton RMLs in 1884. One of the laminated iron embrasures, known as 'Gibraltar Shields', can be seen in the photograph. (Authors' photograph)

Report followed report. In 1848 Gen Burgoyne made the sensible recommendation that the guns on the Devil's Tongue should be turned round to cover the harbour. A report by Col Jervois in 1868 led to the introduction of armoured casemates for the heavy RML guns such as those provided for Montagu, Orange, King's, Alexandra, Engineer's and Parson's Lodge Batteries. He also proposed the extension of the New Mole.

By this time Gibraltar had become the premier gunnery station in the world, as W.H. Bartlett noted:

> *Ranges of Batteries rising from the sea, tier above tier, extend along its entire sea front at the northern extremity of which is the town; every nook in the crags bristles with artillery.*[4]



The arrival of the 100-ton guns at Gibraltar at South Mole, dated December 10, 1882. The figures on the platform behind the gun allow its massive scale to be appreciated. (Courtesy of the Gibraltar Museum)

As the 19th century progressed, Sir John Jones's recommendations for pulling guns further up the hillside continued to be implemented. This process culminated in the six 10in. high-angle RMLs at Spyglass Battery and later with the 9.2in. gun batteries sited on the knife-edge of the upper ridge of the Rock. This brought problems of its own, especially the loss of visibility during levanter (easterly) winds, when the upper Rock became shrouded in cloud. It therefore became necessary to site position-finding cells further down the Rock which could then relay information on bearing and elevation to the gun positions above.

As the British Empire grew, so did the need to keep the commercial routes secure; Gibraltar's defensive strategy moved away from siege fortifications towards coastal defence. The need to protect a fleet, safeguard its facilities, fuel and stores meant that a beleaguered garrison would need to be equipped to hold out until reinforced by the Royal Navy. Three main contingencies were considered: a naval bombardment (most probable), an amphibious attack by small forces, and a full-scale invasion. The need to adequately guard against these became especially acute following the opening of the Suez Canal in 1869 and the increased popularity of the Mediterranean route to reach the Far East.



The 100-ton gun

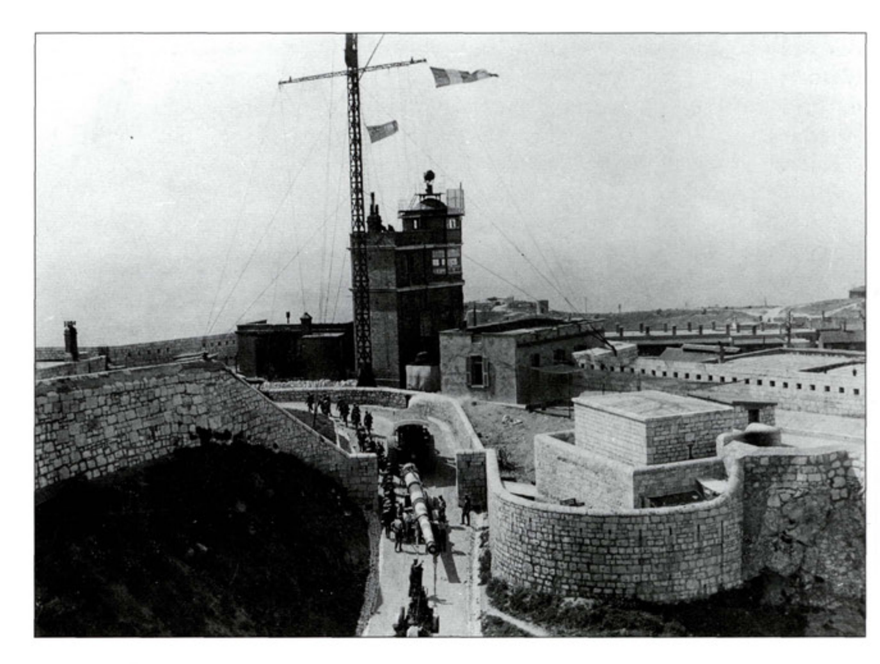
Following the defeat of the navy of the newly unified Italy by the Austrians at the Battle of Lissa in 1866, Italy changed strategy and opted for a new and small fleet of large and powerful ironclads. In 1874 Sir William George Armstrong, English inventor, industrialist and engineer, was approached by the Italians to design the monster 100-ton guns for these ships.

The British government observed developments in Italy with great interest, as the free movement of the Royal Navy could not be hampered in any way. Britain's tenure of vital coaling stations along its 'pink' route to India, via Gibraltar, Malta and the Suez Canal could not be jeopardized. One response was to commission four 100-ton guns from Armstrong and use these to protect the naval anchorages of Gibraltar and Malta.

The guns were manufactured by Sir WG Armstrong at Newcastle upon Tyne in 1870 and were unique in their day. Only two survive now, one in Gibraltar at Napier of Magdala Battery and the other in Fort Rinella in Malta. The guns were referred to at the time as 17.72in. RMLs. These were the largest guns ever manufactured that still needed to be loaded via the muzzle end. Although it took three hours to develop the necessary head of steam to operate the gun (acceptable due to the relative slow speeds of warships at the time), a hydraulic accumulator stored this energy and once ready, the crew of 35 men (all ranks) could fire a shot every four minutes, although in reality the average was closer to six. They were capable of reaching up to eight miles, firing a 2,000 lb. shell with a muzzle velocity of about 1,540ft per second.

4 Bartlett, W.H. *Gleanings of the Overland Route*, London, 1864.

Two tractors and a crew can be seen in the process of transporting a 9.2in. gun barrel (weighing some 28 tons) in this photograph. They are progressing through the barrier between the defensive loopholed walls that guard the approaches to the Retrenchment Block at Windmill Hill. A platoon of infantry in World War I uniforms is caught in the moment of passing the gun, possibly on their way to the Retrenchment Block. (Courtesy of the Gibraltar Museum)



The 9.2in. guns

In the late 19th century, following the decision to return to breech-loading artillery, the armament at most British coast stations was revised and three main categories of guns became the standard complement: 9.2in. guns for long-range counter bombardment, 6in. QF guns for closer defence, and 12-pdr guns for inshore defence.

The new 9.2in. guns were emplaced on the knife-edge of the upper ridge, the west side of the Rock and Windmill and Europa Flats. Those on the ridge were capable of taking on any ships approaching from either the Atlantic or Mediterranean, covering the coast of North Africa and a wide range of targets to the Spanish mainland. The ones further down would engage ships in the Bay, and if possible prevent landings.

The disposition of these gun batteries at the close of the 19th century was as follows:

- 9.2in. (14): Governor's Lookout (×1), Rock (×1), Rooke (×1), Breakneck (×1), Lord Airey's (×1), O'Hara's (×1), Spur (×1), Jews' Cemetery (×1), Levant Gun (×1), Edward VII (×2), West (×2), Buffadero (×1);
- 6in. (14): Princess Royal (×1), Princess Caroline's (×1), Tovey (×2), Lewis (×2), Devil's Gap (×2), Queen's Gate (×2), Genista (×3), South (×1);
- 4in. (4): North Mole elbow (×2), Engineer (×2);
- 12-pdr (10): North Mole (×3), Detached Mole (×2), South Mole (×3), Prince George's (×2).

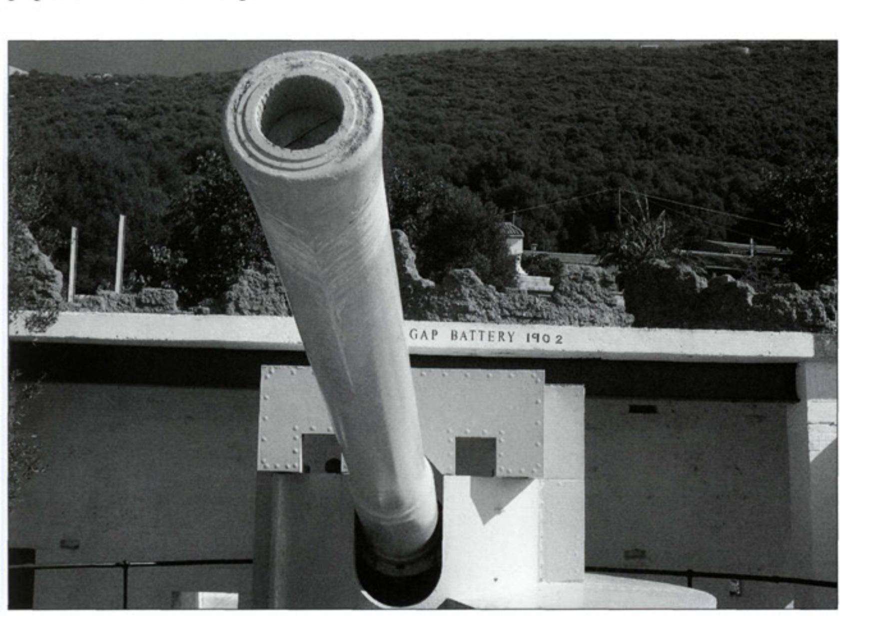
The development of the Naval Yard

There is no doubt that the privileged geographical location of the Rock of Gibraltar has attracted the attention and interest of people since prehistoric times. The Rock is surrounded almost entirely by the sea. The sea, along with the impressive natural walls of the eastern and northern faces of the Rock, has been central to its development as the strategic base and fortress – the fortress of fortresses. The huge, sheltered Bay of Gibraltar goes hand-in-hand with the Rock. This was recognized by the earliest mariners who arrived here from the eastern Mediterranean 2,500 years ago and has remained the case until today. It is interesting that, until the 14th century, the port and anchorage linked to

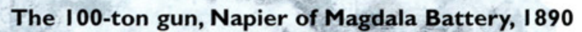
the Rock was at the northern end of the Bay near the mouth of the Guadarranque River. It is with the development and strengthening of the fortified city of Gibraltar by the Spaniards between 1309 and 1333 and especially by the North African Merinid dynasty after 1333, that we see the construction of the first harbour and dock facilities at the base of the Rock itself. The concentration of this facility in the shallow and sheltered north-western end of Gibraltar made sense at that time. With the extension of the New Mole in the 17th century more facilities became available further south. After the inconvenience and destruction caused by the intense bombardment during the Great Siege, between 1779 and 1783, the British concentrated on improving naval facilities to the south, away from the range of fire of land artillery.

The late 18th and early 19th centuries continued to see the increasing importance of Gibraltar as an operating base for the Royal Navy. During the hostilities against Napoleon the availability of a port at Gibraltar, where ships could be repaired, re-supplied and refitted, meant that the Royal Navy could maintain a sustained presence in the area, as a form of active defence. The Mediterranean fleet often called at Gibraltar and Vice Adm Horatio Nelson was a regular visitor. His final visit came on October 28, 1805, when his body was brought to Gibraltar from Trafalgar in a barrel of brandy that was lashed to HMS *Victory*'s mainmast. Nelson's flagship had arrived under tow and was severely damaged. Repairs were carried out in Gibraltar to allow her to sail home with the admiral's body. It was not the first time Gibraltar had proved its worth in this way. The superhuman effort expended by its workers to repair and refit Adm James Saumarez' ships during a naval engagement known as the Battle of Algeciras in 1801 prompted Adm Jervis, hero of St Vincent and First Sea Lord, to write: 'The astonishing efforts made to refit the crippled ships at Gibraltar Mole surpasses everything of the kind within my experience.'

Lord St Vincent was himself instrumental in getting a purpose-built victualling facility built in Gibraltar. This Victualling Yard was constructed at Rosia and completed in 1812. As the war against Napoleon progressed, Gibraltar's importance also grew as a source of funding for Wellington's peninsular campaign. Taking advantage of a loophole in the Continental System, Napoleon's attempt to financially squeeze Britain out of the war by banning trade between countries under his control, Gibraltar was able to continue trading given her status as a free port. Over the first 15 years of the 19th century Gibraltar's population of 5,000 tripled.

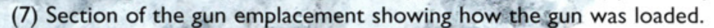


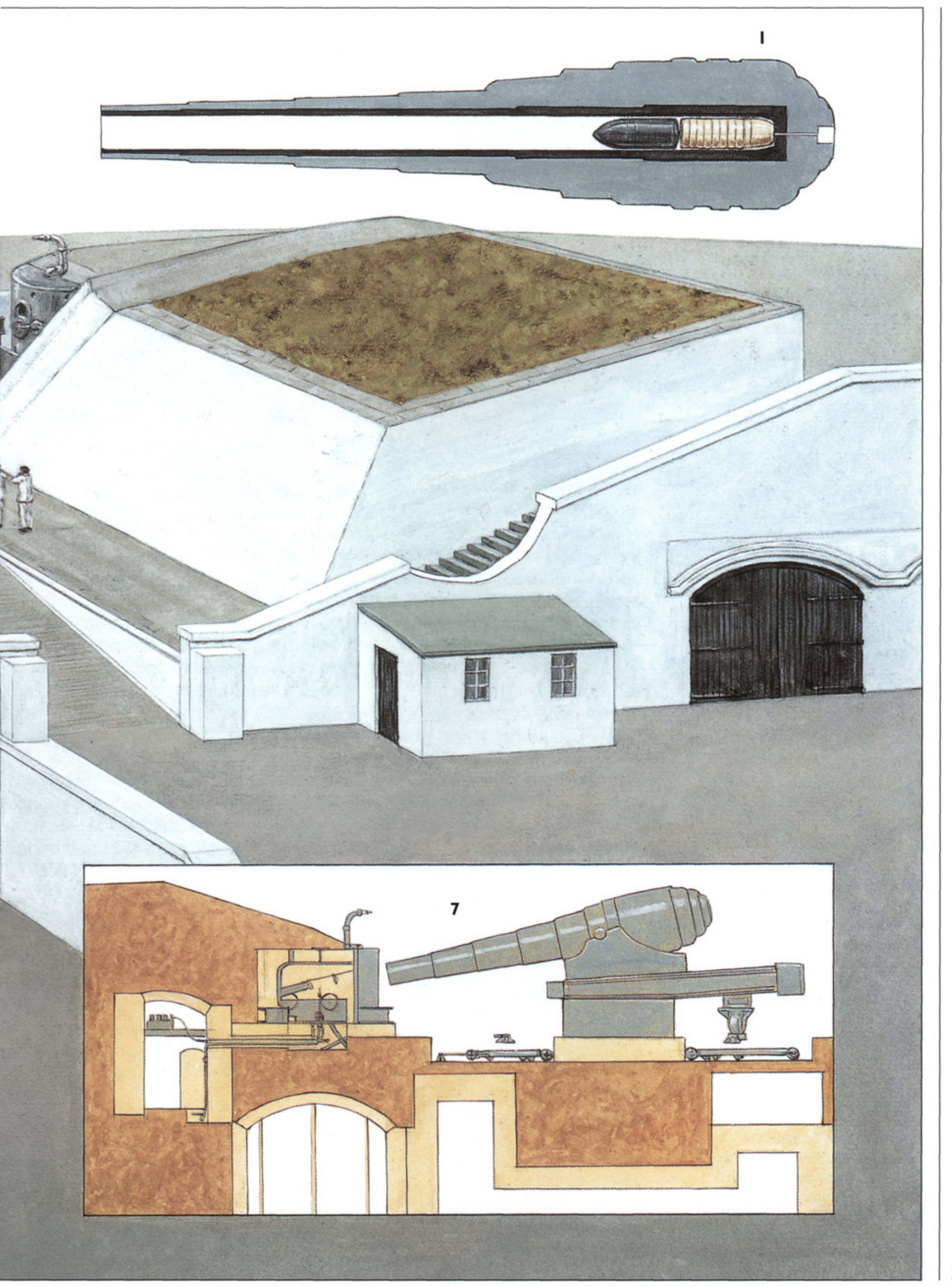
Looking down the barrel of one of the two 6in. Mark IV guns still at Devil's Gap Battery. With a range of 6,000 yards these guns were capable of bearing on land batteries and on the Bay. The battery ceased its coastal defence role in 1954. (Authors' photograph)



The 100-ton gun, Napier of Magdala Battery, 1890

The 100-ton gun saw use in the 1890s, and is shown here firing. It was the first hydraulically operated piece of artillery in the world. (1) A section through the gun's barrel, with its 2,000 lb. shell loaded. (2) The shell store. (3) The cartridge store. (4) Loading turret. (5) Ammunition lift. (6) Artillerymen moving a shell from the shell store. (7) Section of the gun emplacement showing how the gun was loaded.




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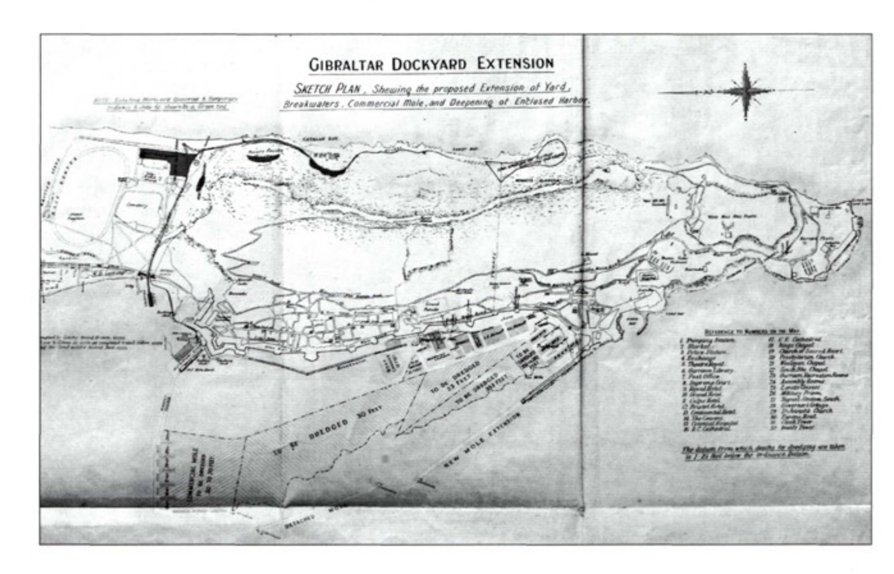
The construction of the Dockyard

Just prior to the start of the main works for the Dockyard and associated facilities in 1894, the naval establishment at Gibraltar was small and antiquated, having developed little since the days of Nelson. It consisted of the New Mole, the small Naval Yard, the Victualling Yard, the Mount, the Royal Naval Hospital and the Rosia Residences. All this was to change in a matter of 12 years, between 1894 and 1906. The old naval yard had been opened during the late 18th century (*c.* 1760) and was the main arsenal for the British Mediterranean fleet until 1833 when the dockyard in Malta took over in importance.

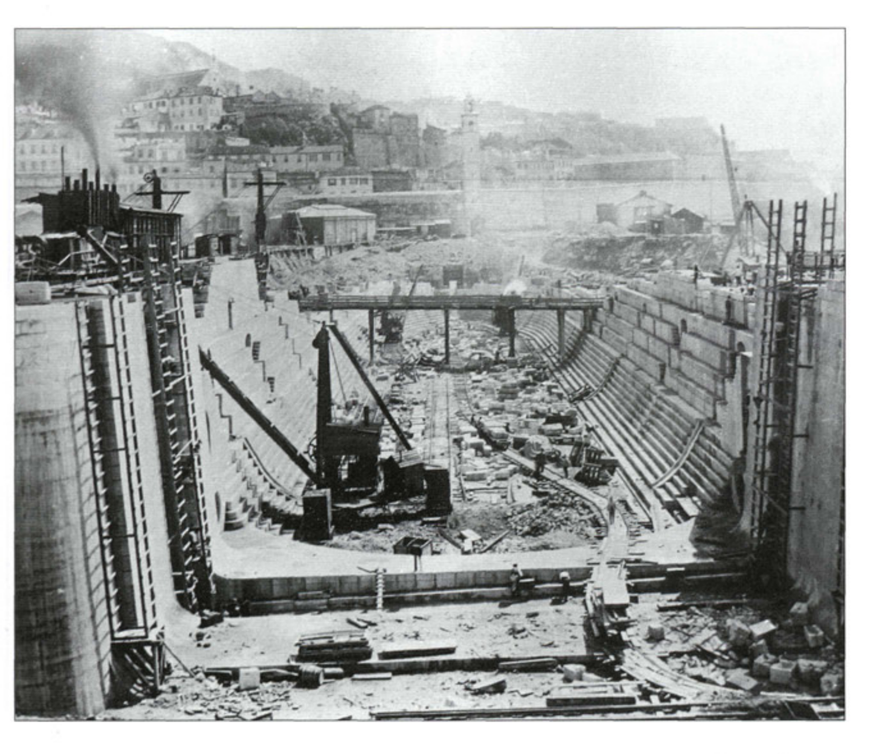
Works of a general nature, using convict and hired labour, were undertaken in 1843 and 1860. An extension to the 300ft 17th-century mole was undertaken in 1851, increasing its total length to 1,309ft and width to 130ft, at a cost of £230,000. This mole provided the only shelter for coaling and victualling at the time of the commencement of the new works. The work was done by convict labour and over 700,000 tons of stone were obtained from quarries on the Rock for the purpose. Between 1842 and 1875 Gibraltar received long-term convicts from across the empire. The 42-ton frigate *Owen Glendower* housed these. Later, cells were built within the Naval Yard itself and the frigate was converted into a hospital ship for the convicts.

The idea of constructing a new dockyard in Gibraltar appears to date to 1871 and the proposal seems to have come from Capt Augustus Phillimore, the Naval Officer in Charge of Naval Establishments in Gibraltar. Several schemes were put forward that year but in 1872 the matter was then left dormant for 15 years. After much debate and various schemes the Admiralty, conscious of the pressing need to provide the strategic Gibraltar base with a safe anchorage and shelter in time of war, pressed on 22 years after Phillimore's proposals. The scheme went to parliament early in 1895 for works to be completed by 1900. The cost would be £1,435,000. The scheme was approved and the expenditure sanctioned by the Naval Works Act of 1895. In 1896 the new Salisbury government obtained approval for a bigger scheme that included three, instead of one, dry docks, a Commercial Mole and a Detached Mole. The cost rose to £4.5 million.

In 1893 a contract to extend the South Mole by 1,000ft had been awarded to Messrs Topham, Jones and Railton. There was a later addition to the original contract that provided for a further 300ft extension. This marked the beginning of the works for the new Dockyard. A year later, in 1894, the Admiralty began



Plans for the Gibraltar Dockyard extension dated August 1898. The plan shows the various quarries that were opened on the east side and the railway line linking them to the main jetty from where materials were transported by barge to the dockyard. The plan also shows the line of the Admiralty Tunnel that was subsequently excavated to provide direct access to the yard through the Rock. The extensions to the South Mole and the new Detached and Commercial Moles are shown as well as the reclamation for the building of stores and depots. The position of the three dry docks is indicated. Also shown are the depths to be dredged within the harbour area. (Courtesy of the Gibraltar Museum)



The picture shows No. 2 Dock under construction. Queen Alexandra named this dock in 1905, Edward VII laid the coping stone for No. 3 Dock, which was named after him, and in 1906 the Prince and Princess of Wales (later George V and Queen Mary) named No. 1 Dock (the largest) 'Prince of Wales Dock' when they called in at Gibraltar on their way back to the UK from India. The precision-cut limestone ashlar can be seen clearly. Work was made possible by the construction of large cofferdams, and the seawater was pumped out, allowing the men to work comfortably. The photographer would have been standing on this cofferdam when he took the picture. (Courtesy of the Gibraltar Museum)

preliminary operations for the comprehensive project that would satisfy the pressing need of the Navy for more shelter, accommodation and facilities in general. The project was to enclose and protect the harbour and extend the Dockyard. The works were carried out by the Works Loan Department under the Naval Works acts of 1895, 1896, 1899, 1901, 1903, and 1905. The main works that were to be undertaken were as follows:

Section No 1 – the extension of the Southern Breakwater by a further 2,700ft. This included the 1,000ft started in 1893;
Section No 2 – A detached breakwater, 2,720ft in length situated between the North and South Breakwaters and lying NNW;
Section No 3 – A large North Mole, with coaling jetties and a viaduct;
Section No 4 – An extended Naval Yard, including three large Graving (Dry) Docks, wharf walls, slipways for destroyers, pumping engine house, workshops, storehouses, offices, railways, etc.;
Section No 5 – The dredging of the harbour.

There are two entrances to the harbour, the northern one having a width of 650ft and the southern one 600ft. The enclosed area of water was 440 acres. Of this, 260 acres had a minimum depth of 30ft at low water. Two culverts were constructed through the base of the South Mole, at the corner adjoining No. 1 Dock, to allow a through-current and preventing floating debris accumulating in front of the docks.

A shipping jetty was constructed at Bayside, and the Block Yard was set up at North Front, by the Devil's Tower. A system of railway communication was established between the Dockyard and the Commercial Mole through the Rock and round Catalan Bay, North Front, Bayside and Waterport. The railway continued south from Waterport along the foreshore, outside the Line Wall, connecting back to the Dockyard. The excavation and lining of a 1,053-yard tunnel between the Dockyard and Sandy Bay and the provision of a railway were subsequently added. This permitted direct land access from the east-side quarries to the yard. The vast amount of rock quarried changed the face of Gibraltar.

OPPOSITE **Construction of the dockyard, 1905**

The main illustration shows the dockyard approaching completion. The three dry docks (1–3) were the most impressive features of this development, and were completed in the following order: Dry Dock No. 3 (King Edward VII Dock), Dry Dock No. 2 (Queen Alexandra's Dock), and Dry Dock No. 1 (Prince of Wales' Dock). Work on No. 1, the largest of the three, is still ongoing here, with a cofferdam in place. Also shown here are details from the construction plans for Dry Dock No. 1, showing plan (4) and section (5) profiles, and three separate sections (A, B and C) taken along the length of the dock at the locations indicated.

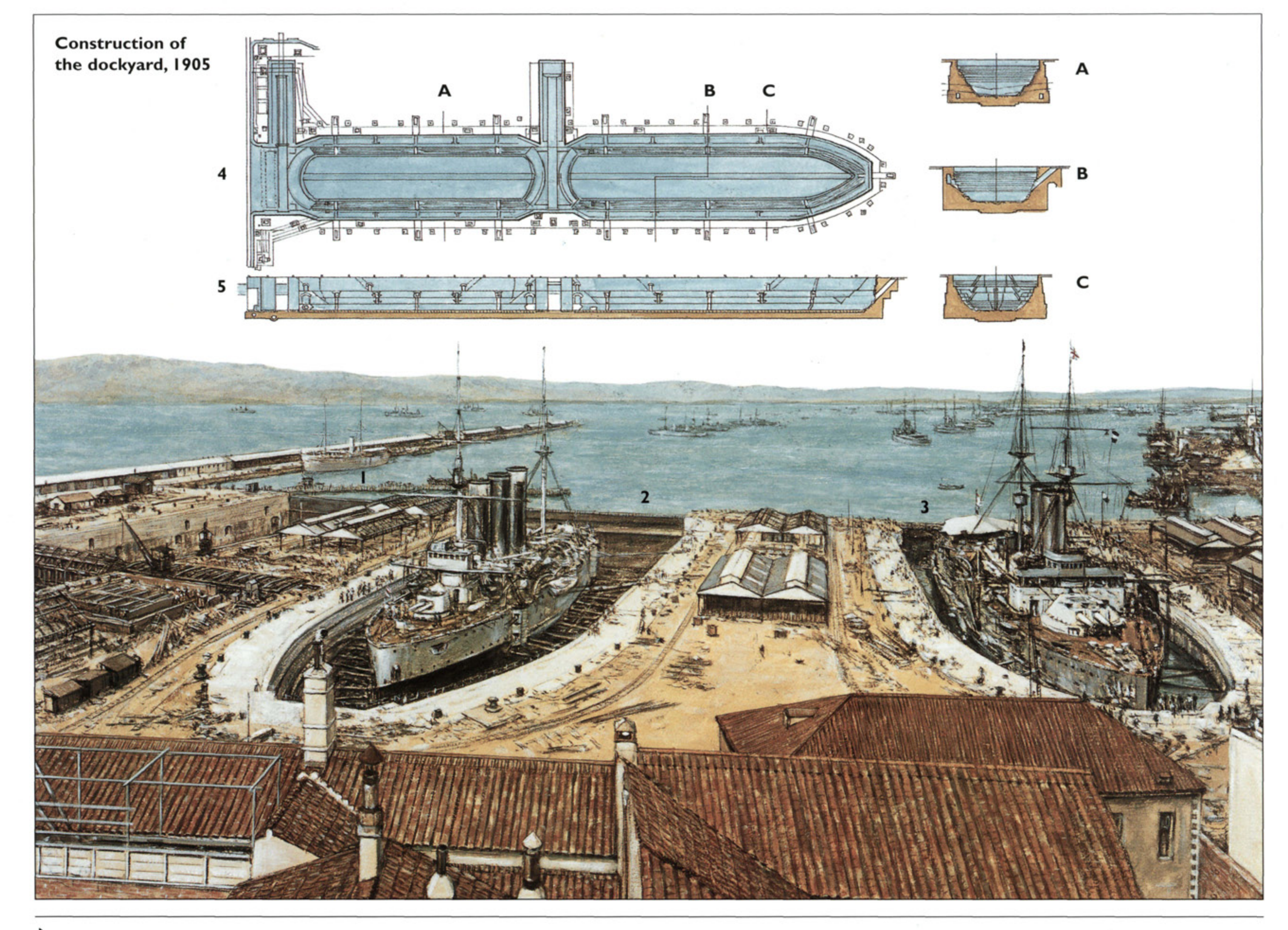


Painting of HMS *Victory* being towed back to Gibraltar after the Battle of Trafalgar with the body of Adm Nelson on board preserved in a barrel of brandy. (R.L. Mannia, courtesy of the Gibraltar Museum)

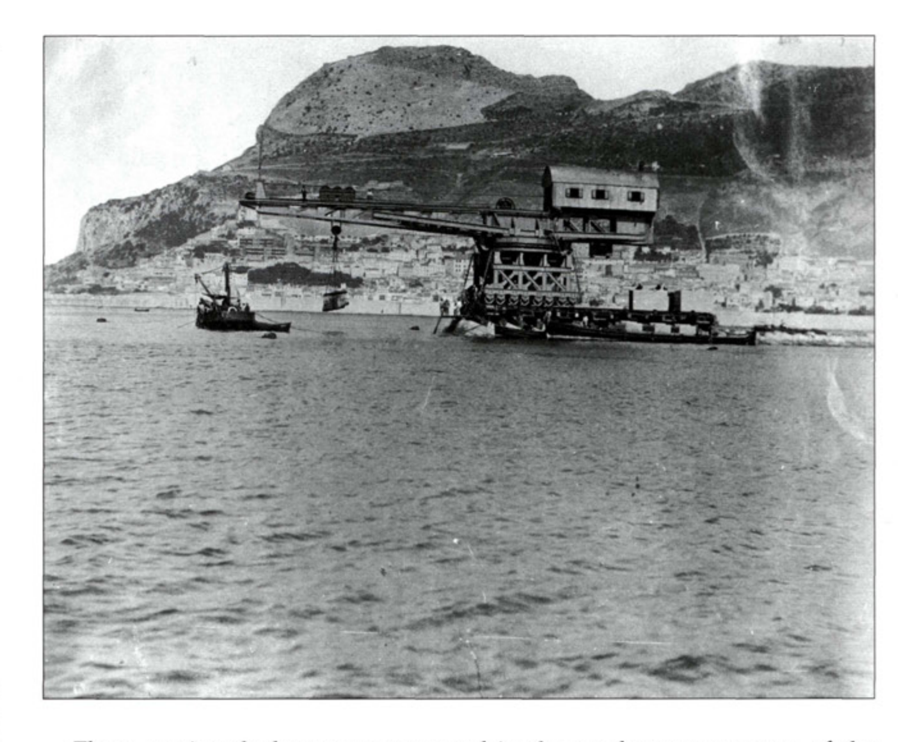
Construction of the moles

The original portion and the extension of the South Mole were of the rubble-mound type with a quay wall on the harbour side. This was a convenient and cheap way of providing a large surface for sheds and railways required in a coaling mole. It was extended to 2,700ft including the round head. The depth of water at the head was 60ft. The surface width from the coping of the quay wall to the face of the parapet wall was 76ft and from the face of the parapet wall to the top of the outer slope 26ft. The outer slope was of 1.5:1 steepness. The depth of low water provided alongside the quay was 30–35ft. The result was a total berthage of 3,550ft and five coal sheds with a total length of 2,300ft.

The North Mole is formed of a western and a northern arm with five interior jetties. The north arm runs westwards from Waterport for 3,000ft and used to include the viaduct. The western arm runs south from the extreme western end of the north arm for 1,500ft with a width of 120ft. The jetties, parallel to the western arm are spaced 200ft apart. Four had a length of 330ft and width of 80ft, the fifth a length of 400ft and a mean width of 125ft. The depths at low water along the various jetties ranged from 20 to 30ft. A viaduct linked the North Mole to the Rock.



Construction of the dockyard, 1905



One of the two titan cranes specially built for the construction of the Detached Mole. Both cranes started at the centre and each worked their way out towards one end of the mole. The crane in the picture is unloading carved blocks from the boat. Each block was cut to fit a particular spot. In order that they fitted as closely as possible, after cutting these blocks were left to dry for a period before being carefully set in place. (Courtesy of the Gibraltar Museum)

Three graving docks were constructed in the south-western corner of the harbour, parallel to the South Mole. A reclamation, bounded by the wharf wall, extended north to Ragged Staff Wharf. The workshops, stores and offices were erected on the reclamation. Eight slipways for torpedo-boat destroyers, a boat house and a slip for small boats were located at the northern end of the yard. North of the Ragged Staff was the auxiliary camber for torpedo-boats.

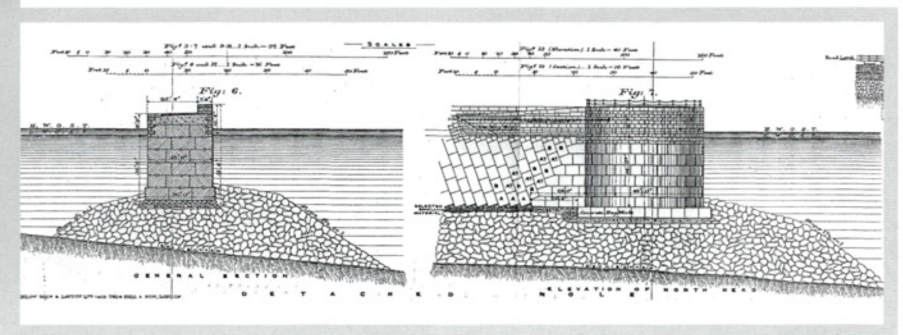
In all, 43 acres were reclaimed and the new buildings covered 11 acres of this new land. 1,600ft of retaining wall were erected at the head of No. 1 Dock and at the south entrance to the Dockyard. The site of No. 1 Dock was half on land and half in the sea. No. 2 was almost entirely, and No. 3 entirely, in the sea. The area of New Mole Parade, required for the inner portion of Dock No. 1, was excavated to the new level.

The three docks were of the same type, the entrances and widths being identical. No. 1 Dock was a double dock with an intermediate sliding caisson. It had six 16-ton hydraulic capstans (the other two each had four). The water capacities of the docks were:

No. 1 105,000 tons at HWOST
No. 2 66,445 tons at HWOST
No. 3 53,335 tons at HWOST

The Detached Mole

To start the block-work of the breakwater, a 100ft-long, 33ft-wide steel caisson with sloping ends was made at a cost of £12,900. The caisson was divided into nine compartments in all; the three at each end were watertight, while the others formed a central well without a bottom. The caisson reached Gibraltar in pieces, was partially assembled on the Dockyard foreshore, and was sunk in place on June 11, 1898. Once the bed had been prepared and levelled by divers the caisson was towed out to its exact position, moored, and then sunk onto its permanent bed and filled with concrete up to a height of 11ft (3.5 m) above low water. After the final concreting the whole mass weighed 8,884 tons. The Detached Mole's base is rubble mound, while the vertical-wall superstructure above is of concrete block-work. Above high-water level it is finished with ashlar masonry and mass concrete. The first concrete block was laid on October 18, 1898 and the last was set in the North Head on March 20, 1901 by HRH the Duke of Cornwall and York, later King George V. The copings and landing-steps were made of granite.



The 20th century and the two World Wars

During World War I the eastern Mediterranean was the main theatre of operations and Gibraltar's principal role was as a fuelling station and dockyard facility. Such was the extent of British sea power that the garrison was only involved in one engagement, in which a German U-boat was sunk off Algeciras.

It was not until World War II that the Rock came under serious threat following the advent of aerial attack. Thus a multitude of anti-aircraft (AA) positions were constructed around the Rock, many upon existing batteries and other military structures. The main AA guns used were the 40mm Bofors and 3.7in., with a further two pom-poms. Many rocket projectors were installed but these proved ineffectual. Searchlight positions were dotted all over the Rock to scan both the sky and the sea.

The other defences installed during World War II concentrated upon the possibility of attack from the sea by means other than a battleship. These included fast motor boats and submarines. Bunkers and pillboxes, especially on the east side, guarded against amphibious landings.

The other possibility was an attack via the land front. During World War II Operation *Felix* was the plan devised by Hitler to capture Gibraltar, but it was never put into operation. Given that guns in the galleries could only provide

In 1906 the pre-dreadnought battleship HMS *King Edward VII* was the first vessel to enter the first completed (No. 3) dry dock, which coincidentally was also named after the same sovereign. The Atlantic Fleet can be seen in the background. (Courtesy of the Gibraltar Museum)



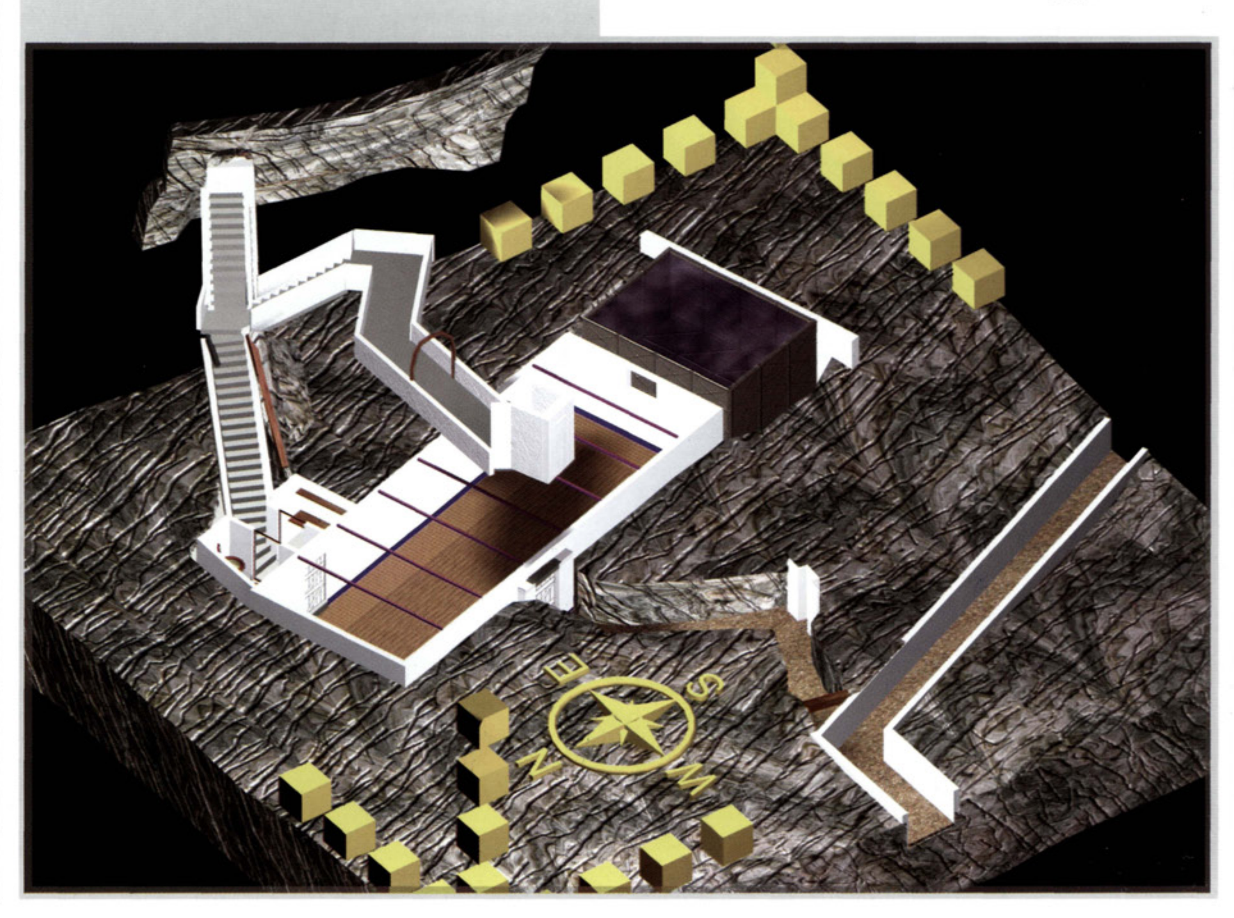
Stay Behind Cave

Stay Behind Cave was a top-secret chamber excavated in the Rock by the Military during World War II. The plan was for six men to seal themselves up there in the event of Gibraltar falling to the Axis powers. From hidden viewing positions, the men would have secretly monitored the movements of the Germans and reported these back to London. Located at the ridge of the Rock, where both east and west faces are in close proximity, the chambers were never used and remain in a good state of preservation. The main chamber would have been used as a living space and has a cork tile floor and plastered walls and ceiling to reduce noise. A water cistern at the end was fed with rainwater via natural gulleys in the rock. Human waste would also be disposed of through natural fissures in the rock. A bicycle-like arrangement with a leather belt would not only have provided electricity to power the radio but an attached fan assisted air circulation. It also provided an opportunity for the men to exercise. A hidden antenna would be paid out down the east side of the Rock at night to transmit and receive messages. A small access tunnel leading up from the main chamber split into two, one leading to a concealed viewing platform to the east side of the Rock. The second passageway led to the west side, where the risk of discovery was greater. A narrow horizontal slit allowed the entire Bay to be observed; this would be sealed up with a concrete wedge when not in use. A 3D reconstruction was produced from the results of a 1997 archaeological survey by the Gibraltar Museum and is reproduced here courtesy of José and Julio Aguilera.

plunging fire, rather ineffective against mobile targets, the vulnerable land front was covered by barbed-wire entanglements and minefields. An anti-tank ditch, the Caledonian Canal, was dug, and concrete dragon's teeth embedded along the isthmus to deter a tank assault. This was backed up by a number of anti-tank guns positioned at ground level within galleries or bunkers. Given the possibility of long-range bombardment of the Rock, were Spain to enter the war on the side of the Axis powers, the plan was to capture, occupy and defend a large part of the surrounding countryside with a view to keeping the enemy as far away as possible until reinforcements could arrive.

Force H and Operation *Pedestal*

Following the French surrender on June 26, 1940, a squadron was hastily assembled at Gibraltar to take over the role of controlling the western Mediterranean. Force H, as it was known, consisted of the battleships HMS *Valiant* and HMS *Resolution*, the aircraft carrier HMS *Ark Royal* (later sunk in 1941 about 30 miles east of Gibraltar), the battle cruiser HMS *Hood* (sunk by the *Bismark* on May 24, 1941) and the cruisers HMS *Arethusa* and HMS *Enterprise*, along with 11 destroyers. Gibraltar became a vital link in the supply network to



Malta and other Mediterranean bases and was instrumental in the successful outcome of Operation *Pedestal*, which saved Malta.

The only seaborne attacks upon Gibraltar were carried out by Italian 'frogmen' who operated two-men underwater torpedoes, known to their operators as *maiali* ('swine' – giving their difficult handling) but which were more commonly known as 'chariots'. Anti-submarine nets were set up across the harbour entrances. These could be dropped to allow shipping to enter and leave. Commander 'Buster' Crabb was instrumental in undertaking both under- and above-water countermeasures against these attacks.



ABOVE Over 100 aircraft assembled at the airport for the Allied invasion of North Africa, code-named Operation *Torch*. (Courtesy of the Gibraltar Museum)

The tunnels and the airfield

By 1903, with new breech-loading artillery having been introduced, priority was given to the excavation of new galleries inside the Rock that linked all gun positions via underground passages. These galleries were to include additional bomb-proof accommodation with a capability of housing 2,000 men.

The next major episode of fortification occurred during World War II, and involved extensive tunnelling inside the Rock and the construction of the airfield. Between 1939 and 1945 tunnelling inside the Rock took on a new dimension as the army used diamond-drill blasting for the first time. Its aim was to permit the necessary facilities for the garrison to live, under siege, inside the Rock for up to a year. The facility was to cater for a garrison of 16,000 men. The design of the tunnels therefore had to cater for water and food supplies, electricity provision, hospitals, sanitary facilities, laundry and accommodation.

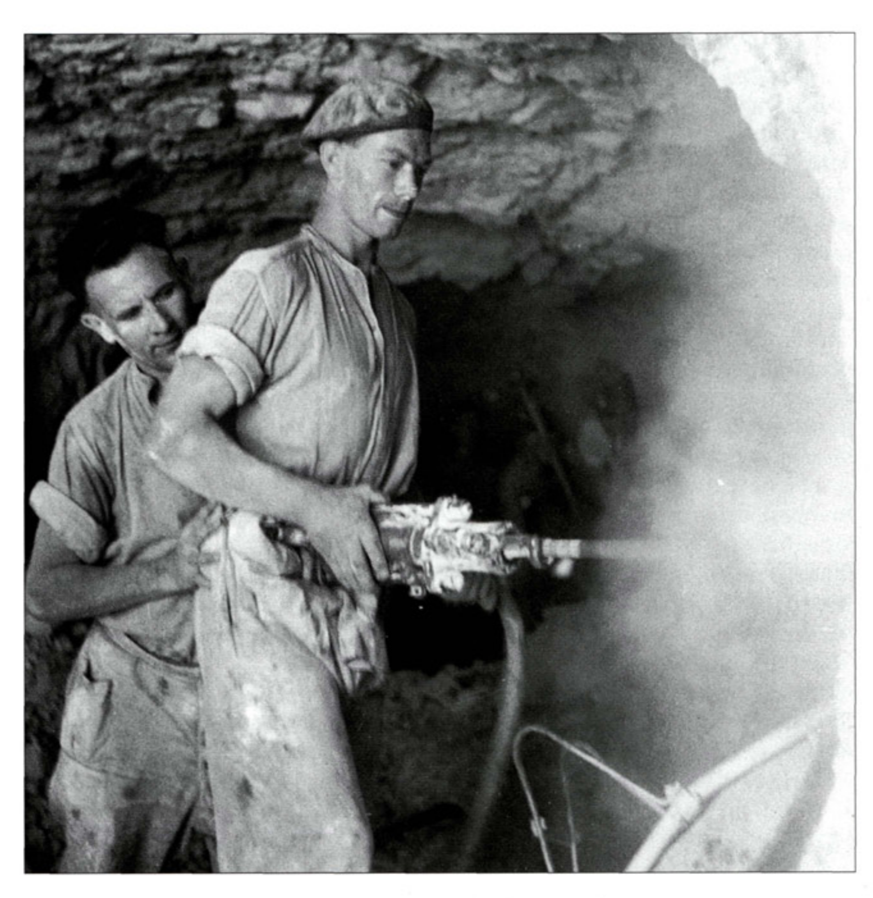
Plans to develop an airfield in North Front received a major boost towards the end of 1941 when the British government took the decision to construct a 1,550-yard runway (later to be extended to 1,800 yards) with a width of 150 yards. The scheme was to involve reclamation of land westwards towards the Bay of Gibraltar by 570 yards. Extensive blasting on the northern slopes and in the tunnels provided the material (estimated at 7,500 tons daily) for the foundation for the runway extension. The final length of 1,800 yards was completed by July 1943.

Tunnelling, therefore, provided the necessary volume of rock that enabled the construction of the runway on the isthmus, north of the Rock. Tunnelling continued after the war and the total length excavated was 34 miles. This runway later proved invaluable as the launching platform for Operation *Torch*, the Allied invasion of North Africa.

BELOW A photo of Gibraltar from the air with the layouts of the major tunnels superimposed. (Courtesy of Stephen Perera/Lewis Stagnetto Ltd.)



Tunnelling during World War II. Much of the rubble generated during this process was used to create landfill when the airport was constructed. (Courtesy of the Imperial War Museum)



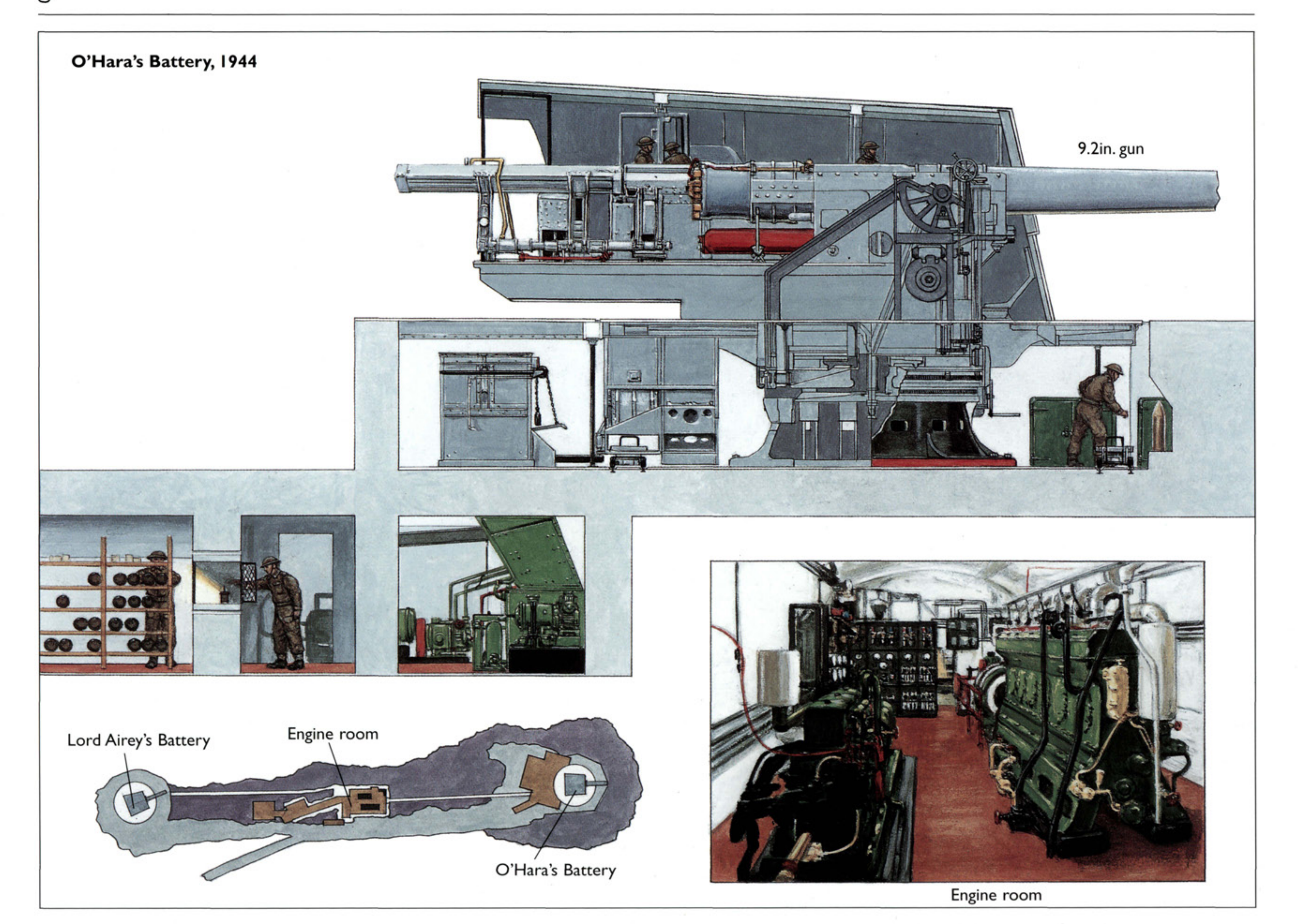
Troops mess hut within the tunnels during World War II. Electric ovens were used to cook the food. (Courtesy of the Imperial War Museum)

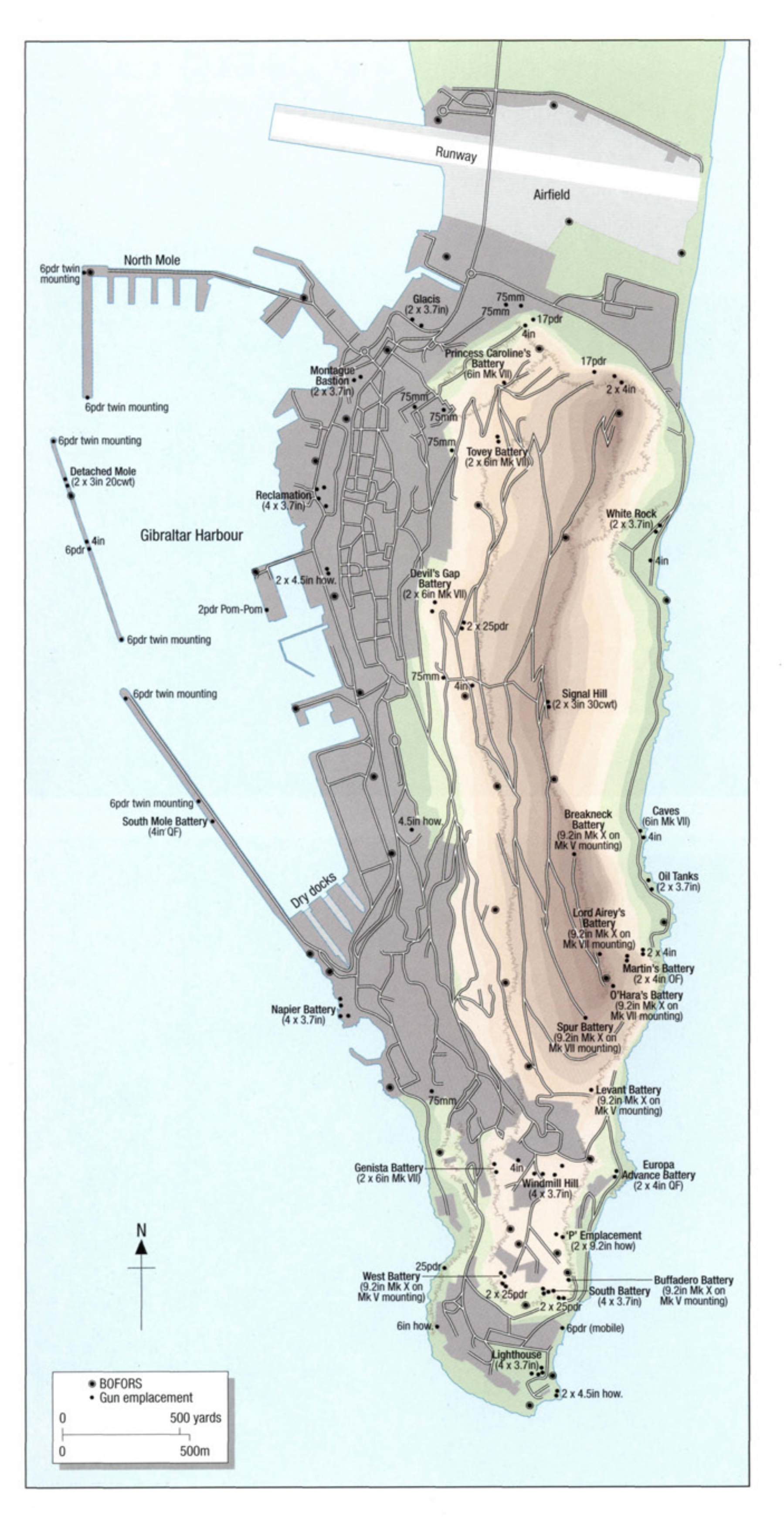




'Minor sick and wounded' were accommodated in two-tier bunks. More serious cases had hospital beds. Note the stone wall alongside the bunks. A suspended ceiling of corrugated iron sheeting protected the men from water drips and small stones that could fall from the tunnel roof. (Courtesy of the Imperial War Museum)

A Hudson fighter-bomber raises clouds of dust as it prepares to leave. (Courtesy of the Imperial War Museum)


O'Hara's Battery, 1944
9.2in. gun
Lord Airey's Battery
Engine room
O'Hara's Battery
Engine room



OPPOSITE PAGE

O'Hara's Battery, 1944

This illustrations shows the layout of O'Hara's Battery towards the end of World War II. The battery was located on virtually the highest point on the Rock, and boasted an almost 360-degree arc of fire. O'Hara's was armed with a 9.2in. gun, as was its sister battery, Lord Airey's, shown on the plan view at bottom left. Both batteries made use of the engine room as a power source. A cutaway profile of the 9.2in. gun, and its Mk VII pedestal mount, are shown in detail in the upper part of the illustration.

LEFT The defences of Gibraltar during World War II showing the locations of the known gun batteries.

ABOVE Force H in 1940 with HMS *Ark Royal* at right, HMS *Hood* at South Mole and HMS *Renown* at Detached Mole. (Courtesy of the Gibraltar Museum)



RIGHT A World War II 40mm Bofors gun position at Royal Battery, over 1,300ft above sea level. (Courtesy of the Imperial War Museum)

Aftermath

With the end of World War II, the Gibraltarian population that had been evacuated en masse to London, Northern Ireland, Madeira and Jamaica gradually returned to the Rock. However, young Gibraltarian men had remained in Gibraltar and actively contributed to the war effort. The Gibraltar Defence Force (GDF), composed of local volunteers, paraded for the first time on April 28, 1939, and was mobilized as an anti-aircraft unit on September 2, 1939, seeing active service during the war. The permanent cadre and reserve of the GDF formed into the Gibraltar Regiment on August 30, 1958. Since April 1, 1991, the regiment has been an all-infantry unit, taking over duties as resident battalion, while the garrison on the Rock shrunk due to defence cuts. In 1982 the regiment was re-equipped and reorganized almost overnight in preparation for the Falklands campaign. The dockyard was active at this time and was responsible for the refitting of the SS *Uganda* into a hospital ship in record time. During 1987 the Gibraltar Regiment was armed with anti-aircraft missiles and provided initial air defence cover during the Libyan crisis.

The role of the fortress has significantly changed since World War II. The cold war years saw the further development of facilities inside the tunnels. This included the provision of new power-generating facilities at Calpe Hole. The Rock became a NATO monitoring station for the passage of the Soviet fleet through the Strait of Gibraltar. The 1980s saw the reduction of the naval base and the conversion of the dockyard into a commercial facility. Gibraltar now represents a unique sequence in the evolution of fortifications, and functions as a permanent testimony to the people, military and civilian, that fought and lost their lives in its defence.

One of two 6in. BL Mk VII guns on central pivot Mk II mountings at Devil's Gap Battery. It operated during both World Wars and was only decommissioned in 1954. However, its guns and supporting infrastructure were left in place and can still be visited by the adventurous. (Courtesy of Stewart Finlayson).



The sites today

Gibraltar's military past has left it with a rich legacy of fortifications, many of which still remain, in various stages of repair. Some have been subsumed under or are hard to find in the midst of later building works. Many of the bastions and walls provided strong foundations for construction, especially during the mid-20th century when land was at a premium. It is therefore not uncommon to find many of these fortifications supporting newer structures. A large portion of these fortifications, however, can be visited and many are popular visitor attractions. In this section we will attempt to give an overview of the main sites that can still be seen.

In the North Front, the Upper Galleries are an important visitor site, today called the Great Siege Tunnels. There is ample interpretation to allow visitors to experience what the site might have been like during the Great Siege. Most of the ordnance remaining comprises Victorian 64-pdr RMLs on cast-iron Gibraltar carriages.

The upper section of the Middle Galleries has also been restored recently and regular guided tours are available. The 5.25in. guns at Princess Anne's Battery are still in situ. Most of the King's, Queen's and Prince's Lines still remain, although these are not maintained and are in many places overgrown. However, the section of these northern defences from Princess Caroline's Battery through to Grand Casemates Square are currently undergoing restoration, and a visitor route linking both these sites should open in the near future. Grand Casemates Square has recently received a major makeover and the Grand Casemates themselves have been sensitively restored and now house restaurants and shops.

The inundation has now been reclaimed and built upon but its presence is remembered in the name of Laguna Estate, which now stands on its site. Similarly Glacis Estate was built upon the glacis. The Landport fortifications,



Earlier Spanish walls (of darker colour, as they were faced with tapia) and later British additions (lighter stonework) can clearly be seen on the left face of the North Bastion. Even infilled embrasures are discernible. The angle of the flank was increased by the British so as to be able to adequately cover the new Montagu Bastion. (Courtesy of Lionel Culatto)

however, still remain and visitors can walk across the wooden drawbridge over the ditch to enter the city. The integration of the Grand Battery to the planned visitor route to Casemates Square should complete the restoration of these important defences.

The series of bastions and counterguards that protected the north-west approaches to the city still remain, although reclamation activities have meant that they are no longer at the water's edge. The Gibraltar Government's current policy of removing, wherever possible, structures on or abutting the city walls has meant that many of these are now reclaiming some of their former appearance.

The Old Mole and Devil's Tongue Battery remain, albeit as a shadow of their former selves, within a jungle of recent reclamation.

The Line Wall remains in its entirety, as do the various bastions sited along it (North, Montagu, Orange, Zora, Flank, King's, Wellington Front and South Bastion). It is possible to walk along their exterior for the entire length, and along a good proportion of their terrepleins. In many of these it is possible to observe how these fortifications evolved over time, especially the North and South Bastions, both of which date back to the 16th century.

Recent works aimed at restoring the King's Bastion have led to the demolition of a 1960s generating station that abutted it and also of various edifices that had been constructed within its gorge and upon its defensible barracks. As part of an on-going programme to give new uses to such structures, it is planned to use the King's Bastion as a leisure centre which will contain a historical interpretation of its important past.

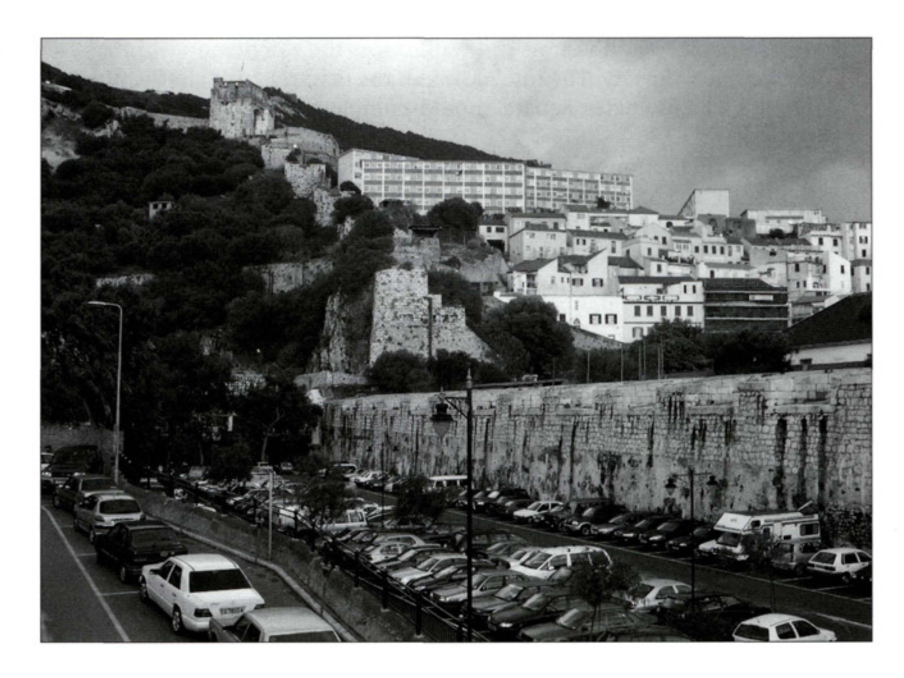
The original retired batteries proved to be ideal foundations for building upon and most of these are now beneath recent constructions. The best-preserved example of these is Jones's Battery, where the wall, parapet and embrasures, together with its expense magazines and loopholed musketry walls, can still be seen, as part of an exit road leading from Moorish Castle Estate.

Perhaps surprisingly, the castle and the walls forming its citadel have managed to survive, although it is necessary to look for these. The best-known part of this arrangement is the Tower of Homage itself, which remains a popular tourist attraction and has been recently restored. It is unfortunately



Recent initiatives by the Gibraltar Government have led to the removal of the modern buildings at the King's Bastion and the clearing of the gorge. Abutting buildings have also been removed. Although it is still there in the photograph, the Generating Station (extreme right) has also gone. There are plans to turn the site into a leisure centre, which will house mounted ordnance of various types, historical interpretations and, where necessary, restoration of this important bastion to return it to its former glory. (Courtesy of Carl Viagas)

View of the Castle Batteries and the Grand Battery. These fortifications follow the original line of defences set down in the 11th century and have been continuously upgraded and developed over time. (Authors' photograph)



not possible to visit the inner keep as for many years this has been the site of Gibraltar's prison. However, there exist plans to move this to another location and its recovery should add another dimension to the site, especially as this still retains parts of the original 18th-century prisons.

The Castle Batteries on the north side remain in good condition and are a wonderful example of how these defences were modified repeatedly throughout the ages. They descend the slope *en cremaillère* and form a continuous line of defence with the Grand Battery.

As the town expanded southwards, the southern walls of the citadel were left behind and this means that there is an opportunity to see a good portion of southern flank defences in a state close to the original. These walls do not form part of any regular tour and they are surrounded by building estates, which occupy almost the entirety of the Qasbah and its surroundings. However, the walk is worthwhile. The Gatehouse still remains, albeit with a later pyramidal roof, which was added during the 18th century when the site was converted into a magazine. One of the square towers can be seen at the entrance to the prison. The other remaining tower is constructed *en bec*, and the surrounding walls retain their crenellated parapets with decorated merlons. It is still possible to see the original 'brickwork' pattern which once decorated the entire wall. The illusion is created using white lime seams about 10cm wide, each 'brick' being approximately 5ft × 2ft. One of the towers was converted into a clock tower during Victorian times and can be seen at the south end of Jones's Battery.

Behind the Line Wall in the region of Zoca Flank Battery there is an underground garage constructed in the gap between the new curtain wall built in the mid-19th century and the earlier Line Wall. Within this garage it is still possible to see one of the original round towers, now surrounded by parked cars.

In the vicinity of Ragged Staff gates are the South Bastion and Ragged Staff Guard, opposite which the Navy Boat Sheds still stand. Continuing up Charles V Wall, the Southport Gates are still in use for traffic and pedestrian access. The ditch in front of these was for many years a sunken garden but has since been infilled. The only remaining portion of the ditch is the present-day Trafalgar Cemetery, where some of those that died of their wounds after the Battle of Trafalgar were buried.

Further up the Wall one reaches Flat Bastion with Prince Edward's Gate tucked in behind its right orillon, so as to protect it from direct fire. Flat Bastion



An aerial view of the castle complex today. Whereas the Castle Batteries to the left are still clearly marked, given their defensive significance until relatively recently, the southern and interior walls and defensive structures are difficult to discern amongst all the surrounding developments. Close observation will show that these are still there, however, and remain in relatively good condition. (Courtesy of the Gibraltar Museum)

is heavily built upon, but it is possible to visit its magazine by request; it is still in a very good state of preservation and includes a firing step to enfilade the curtain wall further up the Rock. The most accessible portion of Charles V Wall is the upper section. At its lowest point, Prince Ferdinand's Battery is now the site of the Apes' Den, a popular tourist attraction. The apes (in reality tail-less monkeys, *Macaca sylvanus*) also have a symbolic relation to the defence of the Rock, as there exists a legend that the day the apes disappear from the Rock it will cease to be British. The morale-boosting importance of this was evident when Winston Churchill himself ordered the importation of apes from North Africa during World War II when their numbers fell to precariously low levels. Healy's Mortar is located next to the Apes' Den.

The naval dockyard below is now run by a private enterprise but is still active as a ship repair yard, and the reduced Royal Navy facilities such as the Tower are still run by the Ministry of Defence (MOD). The Line Wall is still in existence all the way to the South Mole, and the saluting battery has been converted into a promenade. The Casemates and terreplein of North Jumpers Bastion are used by a variety of clubs and restaurants but has remained virtually unchanged. Similarly South Jumpers Bastion (actually a platform) can still be seen but not visited as it is in a poor state of repair.

The New Mole Battery is currently used by the local Fire Brigade for firefighting practice but Alexandra Battery atop it and Prince William's Battery remain in relatively good condition.

One of the best-preserved and maintained batteries is Napier of Magdala, which contains Gibraltar's surviving 100-ton gun. The site is operated by the Gibraltar Tourist Board. Apart from the gun itself and its emplacement, the site also mounts a 3.7in. heavy anti-aircraft gun from World War II. In September 2002, the Gibraltar Museum arranged a mock-firing of the 100-ton gun, assisted by soldiers from the Royal Gibraltar Regiment in period costume.

The Rosia Batteries together with the Victualling Yard complex continue to remain in relatively good condition although some parts are unfortunately being lost to demand for developable sites. The Victualling Yard itself is not open to the public, but Parson's Lodge coastal fort is and a visit is well worth the effort. Operated by the Gibraltar Heritage Trust, visitors are able to see examples of 18th-, 19th- and 20th-century artillery and their emplacements, including examples of Gibraltar Shields.



Mock-firing of the 100-ton gun held in September 2002. The sheer size of the gun can be appreciated when it is compared with the gun crew from the Royal Gibraltar Regiment who dressed up and practised the original firing drill especially for the occasion. The 3.7in. heavy anti-aircraft gun can be seen at centre. (Courtesy of John Bugeja)

Following the coastline towards Europa, various examples of clifftop defences are present including Buena Vista and Eliott's Batteries. Passing through Keighley Way Tunnel one reaches the Europa Flats and the Europa Batteries. The emplacements for some of the guns are still visible whilst others have been converted into viewing platforms. Beneath the Flats the reservoirs at Nun's Well remain but are in a poor state and not open to the public.

Looking north one is faced with the cliffs of Windmill Hill Flats. A fault in the cliffline is bridged by a curtain wall with four gun embrasures. Walking north along Europa Road one can still see the Europa Pass Batteries beneath modern constructions. Behind these there still exists a charming stone spiral staircase to Windmill Hill Flats behind a loopholed musketry barrier.

En route towards the Upper Rock is the Naval Hospital. A large portion of the hospital has been converted into luxury accommodation, but in a sensitive manner that has retained the original buildings. The same applies to the Old Naval Hospital below.

Just above Windmill Hill Flats is the Retrenchment Block. Although it has been allowed to fall into disrepair recently, its masonry walls are still sound, riddled with musketry loopholes. Above this are the gun emplacements for Jews' Cemetery, Levant Gun and Spur 9.2in. gun batteries. At the top of the ridge three 9.2in. gun emplacements survive: Breakneck (MOD property), Lord Airey's and O'Hara's. The last two can be visited by special appointment. O'Hara's is in the best condition and it is possible to enter the chambers beneath that house the generators, magazines and operating machinery.

In the vicinity of these guns is Stay Behind Cave, which can also be visited with a guide by special arrangement with the Gibraltar Museum. However, given the sensitive nature of this site, it is not possible for large parties to visit.

Along the west face of the Rock other gun emplacements can still be visited such as Rooke or Haynes Cave, although all original ordnance and supporting machinery has long since been removed from these. The best of these to visit is Devil's Gap Battery with its two 6in. guns, one of which sank a U-Boat in the Bay during World War I. Although it is not actively maintained it is still worth a visit, but be aware that there are no safety barriers at this site.

A large proportion of the tunnels in Gibraltar continue to be in active use by the MOD. A number of these have been passed to the Gibraltar Government and some can be visited as part of a guided tour. This is a must, in order to appreciate the sheer scale of the tunnelling activities on the Rock.

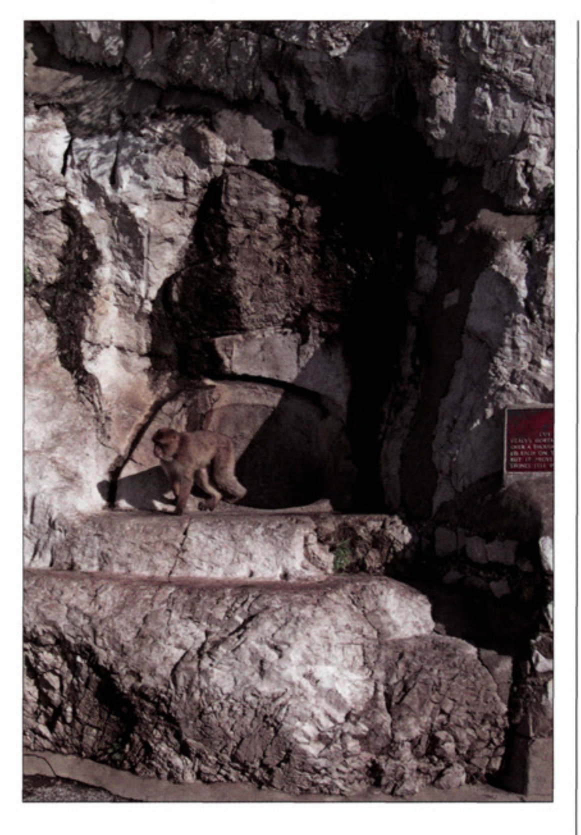
There has been of late a concerted effort to raise awareness of Gibraltar's historic past. The Gibraltar Museum has been instrumental in this initiative, producing magazines and documentaries and organizing public lectures. There exists a re-enactment group in Gibraltar, which recreates parades and other events in period costumes.

The challenge for the future is to be able to manage change, which is inevitable in as small a place as Gibraltar, so as to maximize its potential for future growth whilst respecting and indeed promoting those very facets that make it unique – namely its past as the most famous fortress in the world.

Information for the visitor

Getting to Gibraltar is quite simple, either overland through Spain or via the airport. A number of cruise companies also regularly stop at Gibraltar. There is a good number and variety of hotels and the Gibraltar Tourist Board (tel. +350 74950) can help with all aspects of your visit, including opening times of attractions and guided tours.

A tour is a good way to get a feel for the Rock, but there is often nothing better than walking it yourself, especially given Gibraltar's small size and efficient public transport. A boat trip to view the fortifications from the sea is also worth undertaking. In a similar vein, divers can arrange to dive on sunken wrecks from World War II.



A barbary macaque, often incorrectly referred to as an 'ape', has a drink of rainwater out of Healey's Mortar. This was a stone mortar or fougasse, carved out of the solid rock in the shape of a parabolic conoid. It was test-fired in 1771 with 13 cwt of broken paving stones, which mainly fell in the area just outside the South Front. It could have been a useful weapon in the event of a landing of marines in this area, but the occasion never arose. (Authors' photograph)

The Gibraltar Museum houses exhibits ranging from prehistory through to modern times, including the magnificent medieval baths. It has an especially good collection on the Great Siege and the 1865 Rock model on its own is well worth the visit.

The official language is English, although most locals also speak Spanish. The weather is hot and sunny in summer, although at times the local levanter cloud creates a very humid microclimate. Winters are cool with the most significant rainfall between November and March.

Politically, Gibraltar is a British Overseas Territory. Most Gibraltarians are Roman Catholic, but there are Anglican, Methodist, Church of Scotland, Jewish, Hindu and Muslim communities. Many people consider it a model of a multi-faith, multi-ethnic community. Gibraltar today is a peaceful and hospitable place with very little crime.

The sense of being in a fortress still permeates much of Gibraltar. With some imagination, one can stand at Rosia Bay and see Nelson's HMS *Victory* being towed in after the Battle of Trafalgar, feel the ramparts shudder underfoot at the King's Bastion or see the trebuchets hurling boulders at the Tower of Homage. Whatever your interest or preference, you are sure to find it on this Rock of Ages.

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Glossary

Adit An opening to a cliff face from a tunnel and on the same level as the tunnel.

Advanced works (outworks) Works placed beyond the glacis, but near enough to receive protection from the main fortifications.

Angle of the flank The angle contained between the flank of a bastion and a curtain wall.

Approaches Siege trenches running from one parallel to the next, but lying obliquely to the fortress so that they cannot be enfiladed. Called a 'sap' in siege operations.

Apron A piece of sheet lead used to cover the vent of a cannon to protect against the elements. Also known as the cap of the cannon.

Ashlar Squared-off hewn stone blocks used for the facings of walls.

Atarazana A medieval galley house, used for the construction and repair of oared galleys.

Banquette A step of earth or stone within a parapet, enabling the defenders to fire over the crest.

Barbette A platform upon which guns may be mounted to fire over the parapet instead of firing through embrasures. Pieces so mounted are said to be en barbette.

Barbican An advanced protective fortified work placed in front of the gate of a town wall or fort, or at the head of a bridge.

Bartizan Scottish term, referring to a projecting corner turret or a small overhanging turret on a tower's battlement. Also spelt *bartisan*.

Bastion A pentagonal work of fortification projecting from the curtain wall of a defended area, designed with two flanks in which guns could enfilade the faces of the adjoining bastions.

Battery A section of one or more mounted guns, a named part of the main fortifications (where guns were mounted), or a separate outer works position.

Battlement An alternately high and low parapet protecting the medieval wall walk. Also called crenellations.

Berm A narrow ledge or shelf separating the scarp of the ditch and the exterior slope of the parapet.

Bratticing Wooden temporary breastwork or parapet on top of walls put up during a siege. Projecting bratticing, constructed to allow the defence of the base of a structure, was referred to as hoarding.

Breech-loader A type of weapon loaded through the breech rather than the muzzle.

Bulwark A projecting fortification, sometimes used to describe what was later called a bastion.

Caisson In engineering, a hollow box of iron or wood, open at the bottom, sunk where an underwater construction (such as a pier) will be placed.

Calibre The diameter or capacity of the bore of a gun.

Canister A metal cylinder made of tin, iron, or lead, containing iron or lead balls with sawdust packed between them. Similar to grapeshot.

Caponier In Gibraltar this refers to a projecting work with a round or triangular face and roofed over to make it bombproof.

Carronade A short gun with a large calibre made by the Carron Company from 1779, useful against infantry. Nicknamed 'smashers'.

Casemate A bombproof vaulted chamber built in the thickness of the ramparts to contain a gun position firing through embrasures in the scarp, or barrack accommodation.

Case-shot Similar to the common shell except that the walls of the projectile were thinner. Invented by Lt Henry Shrapnel of the Royal Artillery in 1784.

Cavalier A work raised higher than the ramparts in order to command the surrounding countryside.

Cheveaux-de-frise Large joists into which iron spikes were driven; designed to act as a barrier against cavalry and infantry.

Coehorn mortar A small (4.66in. bore) mortar, named after the famous Dutch military engineer Baron Von Coehorn, designed to throw grenades.

Corbel A projecting stone (or timber) feature on a wall to support an overhanging parapet, platform, turret, etc.

Cordon A stone string course at the top course of a scarp wall, protecting the wall from weathering.

Counterguard A large outerwork, consisting of two faces forming a salient angle and open at the gorge, built to cover a bastion.

Countermine A mine placed under the enemy's positions, usually detonated beneath an advancing force to delay its progress.

Counterscarp The outer wall of a ditch, facing the ramparts and nearest to the besiegers.

Couvreport A small defensive work set immediately in front of a gate so as to screen it.

Covered way A walkway on top of a counterscarp, protected from enemy fire by a parapet.

Cremaillère A serrated or stepped trace of fortifications, designed to allow each section to receive flanking fire.

Crenel An indentation or loophole in a parapet, usually having a merlon on each side.

Crownwork A projecting work consisting of a bastion and two demi-bastions joined to the main body of the place by two long curtain walls, forming a shape similar to a crown.

Curtain wall The main wall of a place lying between bastions or towers and often containing the gates.

Dead angle/dead ground The angle or area below and beyond the fortifications within range of an earthwork's weapons that cannot be seen and defended from a parapet or a rampart.

Defilade To raise a fortified work in order to screen it from the view of an enemy.

Demi-bastion A half bastion with one face and one flank.

Demi-gorge Half of the gorge, or entrance to a bastion, measured from the angle of the curtain to the centreline of the bastion.

Direct fire Incoming fire striking perpendicular to the parapet or line of battle. Incoming fire could be direct, enfilading, plunging, reversed, and ricochet.

En bec A tower *en bec* is one that is beaked or pointed at the base to defend against mining in particular.

Embrasure An opening in a parapet wall or from a gallery to the cliff face through which a gun may be fired.

Emplacement The prepared ground for an artillery weapon, sometimes simply a hardstanding but often a complicated brick, stone or concrete structure comprising magazines and crew shelters.

Enciente The body or area of a place enclosed within its main line of ramparts and parapets but excluding its outworks.

Enfilade Fire directed from the flank of a line along the length of a ditch, parapet, wall, etc.

Entrenchment A fieldwork position fortified by trenches.

Expense magazine A powder magazine close to the guns and containing enough made-up ammunition to last for 24 hours.

Face The front of a bastion between its salient point and its flank.

Field of fire An area within weapons' range that can be seen and swept by fire.

Flank The portion of a bastion lying between its face and adjoining curtain, i.e. the 'sides' of the bastion.

Flanked Any work or outwork which is defended by gunfire from another work is said to be flanked by it.

Flêche A small, detached redan often with a central, bisecting traverse, corridor or caponier to the main work, giving it the appearance of an arrow.

Fougasse A hole dug in the rock, with an opening set obliquely upwards to the front facing an enemy attack, filled with gunpowder, timber, and rocks, and fired like a fixed mortar.

Gabion A wicker basket filled with earth, used to protect guns from enemy fire or soldiers while they were digging trenches.

Gallery An underground tunnel or passageway, dug for military or mining purposes. There are three tiers of casemated galleries in the north face of the Rock: the Upper, Middle and Lower Galleries.

Glacis A long slope extending beyond the ditch and covered way to the natural countryside, across which the enemy must move and be exposed to fire from the ramparts.

Gorge The neck or back part of a bastion.

Grape (shot) An artillery projectile consisting of small cast-iron balls grouped together to make a scattering charge.

Gun carriage A wheeled support on which a gun is mounted.

Haxo casemate A vault constructed over a gun and open at the rear so that the smoke could escape. A proposal made by Gen Haxo (1774–1838).

Hornwork A work of fortification projecting from the main lines and consisting of two demi-bastions joined by a curtain and connected to the main work by two parallel wings.

Hot-shot Cannon balls that are heated until red-hot, used against wooden ships.

Howitzer A piece of ordnance shorter than but of much larger calibre than a gun of the same weight. Designed for high-angle, low-velocity fire.

Interior slope The inner sloping face of a rampart or terreplein.

Inundation Flooded ground in front of or within a fortification for defensive purposes.

Keep The central tower of a fort serving as a last defence.

Loophole Narrow vertical aperture through which small-arms could be fired.

Magazine A secure, water-tight place to store ammunition and to protect it from accidental discharge or incoming artillery fire.

Mantlet A curtain of woven rope hung inside the embrasure of a casemate to protect the gun and detachment against splinters or burning material entering the casemate.

Merlon The raised part of the parapet between two embrasures.

Mine A tunnel dug beneath an enemy fortification.

Mortar A short piece of ordnance with a large bore and trunions near its breech.

Muzzle The mouth, or opening, of the bore of a cannon tube and the face that surrounds it.

Ordnance Shot guns, shell guns, howitzers, carronades and mortars.

Orillon A projecting 'ear' placed to protect the flank of a bastion from enemy gunfire.

Palisade A barrier or fence made of strong sharpened wooden stakes driven into the ground.

Parallel A continuous entrenchment excavated by the attackers parallel to the general contour of a fortress being besieged.

Parapet A breastwork in stone or earth designed to cover troops from observation and fire.

Pierrier A petrero, or stone-throwing cannon or mortar.

Pillbox Small concrete emplacement often used to site machine guns.

Pintle An upright metal pivot pin about which a carriage swivels.

Place of arms Within a system of fortifications, a place under cover from the enemy where troops can assemble safely for a sally out.

Platform In fortification terms platforms have two flanks but only one face that is parallel to the curtain wall.

Plunging fire Direct fire on an enemy from a superior position when the guns have to fire downwards.

Postern Secondary lesser gate or back doorway, usually some distance from main entrance of a castle or ward.

Putlog holes Holes left by the withdrawal of timbers used to secure scaffolding.

QF A quick-firing gun where the rate of fire is increased by having the shell and cartridge joined together so that they can be loaded at the same time.

Quoin A wedge made of oak and used to elevate a gun before the advent of the elevating screw.

Racers Curved metal rails or runners on which the wheels or trucks of a traversing carriage run.

Raise A secondary inclined opening driven upward from a level to connect with the level above.

Rampart A protective mound of earth or stone raised inside the curtain wall.

RBL Rifled breech-loading gun.

Redan An advanced work, consisting of two parapets whose faces join in forming a salient angle toward the enemy, like a letter 'V', in which the apex is to the front.

Redoubt A small, enclosed fortification designed to be defended from all sides.

Retired battery A battery placed not on the coast, but in the hills behind.

Retrenchment An interior defensive line constructed within or in the rear of another work in order to strengthen it, especially after a breach has been made.

Revetment The facing of a wall with either temporary materials such as sod, sandbags, gabions or planks, or with permanent materials such as stone or brick.

Ricochet The method of firing a gun at such a low angle of elevation that the projectile grazes (strikes) the surface at a low trajectory and continues to skip along the surface of the ground with a series of rebounds.

Rifling The technique of cutting spiral grooves into the bore of the barrel of artillery and firearms weapons, achieving greater accuracy and stability of the projectile.

Royal A small mortar.

RML A muzzle-loading gun with a rifled bore to twist a shell in its flight.

Rocket Projector Developed from the Congreve Rocket, this is a self-propelled projectile or missile.

Salient The portion of a work which juts out.

Sally-port An access passage to a ditch or the outside of a fortified work, primarily to provide for sorties.

Sap A zig-zag trench cut in the ground by attackers when approaching a besieged place under the fire from the garrison.

Sapper A pioneer or engineer engaged in digging field or siegeworks.

Scarp The inner wall of a ditch – the wall or bank immediately in front of the rampart.

Shoulder A projecting angle between the flank and the face of a bastion.

Slide The base of a heavy gun upon which it recoils, sliding back.

Smoothbore (SB) An early gun with a smooth cylindrical bore for firing a round shot or a shell.

Solid shot A solid iron projectile cast without a powder chamber or fuse hole.

Spike To intentionally render an artillery piece unserviceable to avoid its capture and use by the enemy.

Tapia A strong type of adobe made of sand, lime and small pebbles. In early medieval walls it was used as poured concrete to form walls. In later stone structures it was used as a mortar and to render the surface.

Tenaille A small outwork placed to cover a curtain between two bastions.

Terreplein The surface of the rampart upon which guns are mounted.

Trace Outline of a fortification as drawn on a plan or 'traced' upon the ground.

Traverse An earthwork sometimes faced with brick or stone of the same height as the parapet and which runs back into the work to prevent enfilade fire sweeping the gun platforms.

Traversing platform A slide upon which a gun carriage is mounted.

Trebuchet A large stone-throwing siege engine.

Trunnions The two short cylinders that project from the sides of a gun barrel. These rest on the cheeks of the carriage and support the barrel.

Wad Rope yarn twisted around the projectile, commonly referred to as 'ring wads' in the army and 'grommets' in the navy, which increases the accuracy of fire.

Wicket A small gate or door (especially one that is part of a larger door).

Windage The space, or difference, between the bore diameter and the diameter of the projectile.

Winze A mining term meaning a side tunnel communicating with another at a different level.

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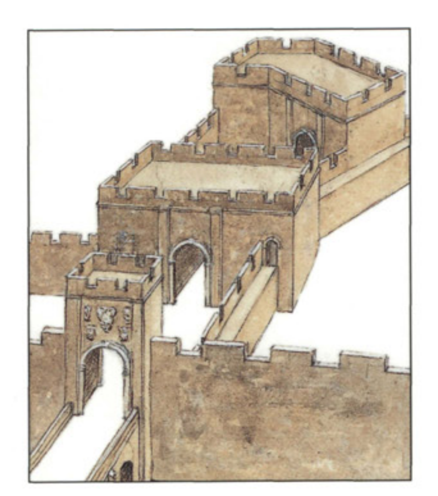
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